Making Alignment Happen!

Enterprise Architecture Management Guidelines to align Business and IT and Strategic and Tactical level

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Summary

Currently Marel is working on becoming “One Marel”. Due to all the acquisitions and the differences in the inherited vision, culture, IT landscape, size and technology orientation it is very clear that there is a misalignment between strategic and tactical level and between business and IT. Therefore Marel needs to change and Enterprise Architecture Management (EAM) is a discipline to guide this change. To improve the alignment it is important to know what guidelines are needed to facilitate this. Therefore the objective of this research is to:

Develop and improve enterprise architecture management guidelines to manage the alignment between business and IT and between strategic and tactical level.

To be able to fulfill the objective, the following main research questions need to be answered:

RQ 1: Which EAM guidelines need to be developed to manage business and IT alignment and the alignment of strategic and tactical level, based on theoretical research?

RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?

RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?

The research approach for this project is the formulative research approach and consists of three main stages which are: the literature study, the empirical research and the analysis of the results. These three stages consist of 8 steps (figure 2) that lead to the final outcome of this research project.

Theoretical Framework

An exhaustive study is conducted to find existing guidelines. Only within the research area of business management, guidelines were found for the alignment of strategic and tactical level. Within the research areas EAM and IT management there were no guidelines found for the alignment of business and IT or strategic and tactical alignment. However factors, critical success factors, processes, practices and tasks were found from which guidelines could be conducted. The result of this study is a theoretical framework that describes in total 105 guidelines divided into six topics. Therefore this framework provides the answer to research question one.

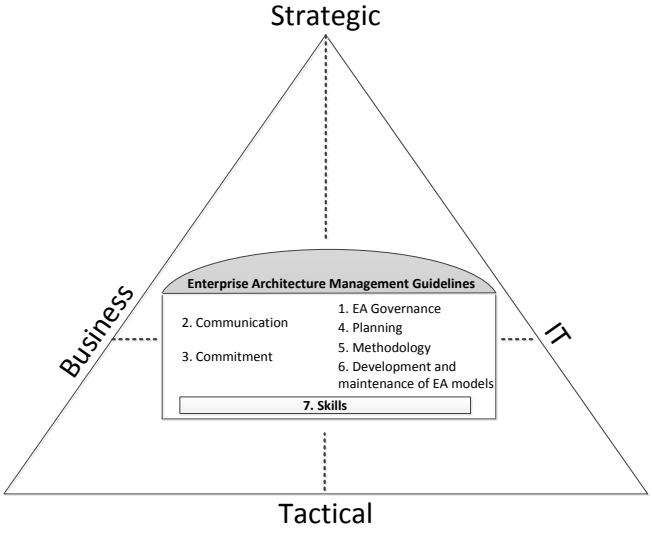

Figure 1: Framework for EAM guidelines

Empirical Research

For testing the theoretical framework, empirical data is collected. This data is collected via a single embedded case study. The advantage of the single embedded case study is that it can provide a good understanding of the context, which matches the exploratory character of this research. The single embedded case study consisted of three phases. The first phase reduced the amount of EAM guidelines by checking which guidelines could be combined and which were not applicable to Marel. The second phase was to value and improve the theoretical framework and corresponding guidelines and the third phase was to validate the data received during the second phase. The blue section of figure 2 shows where the single embedded case study is positioned within this research.

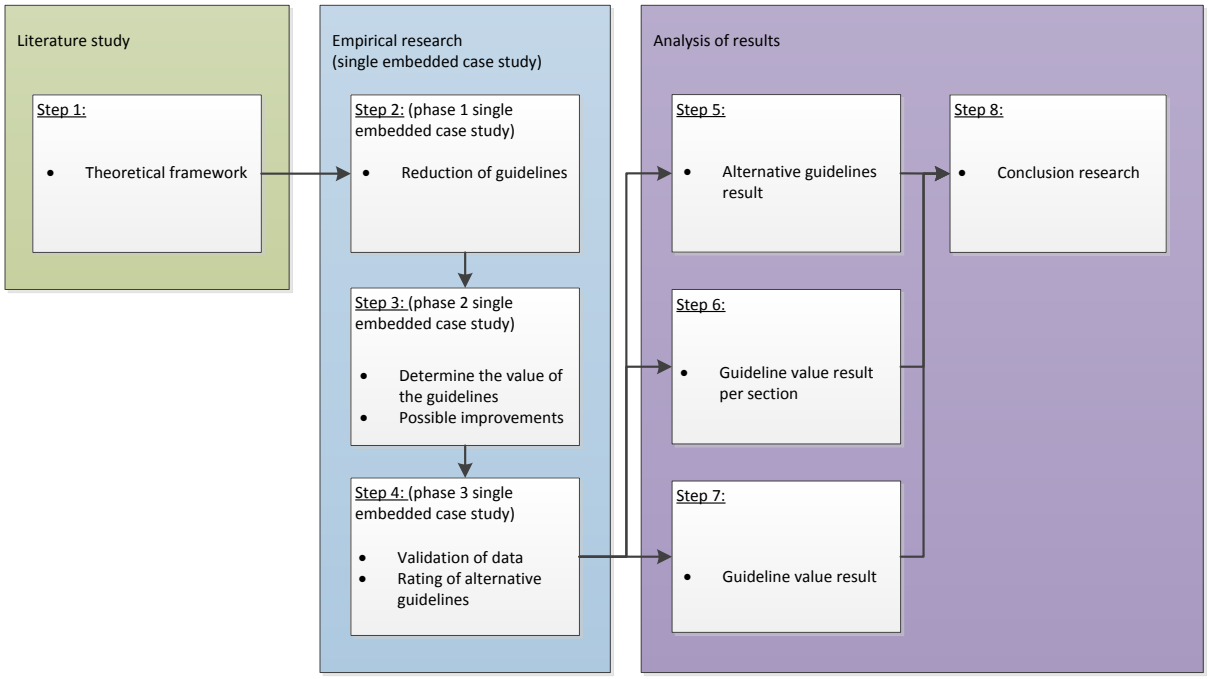

Figure 2: Research process

To gather the empirical data for the first two phases of the single embedded case study a semi-structured interview was conducted. For the third phase the empirical data was received via email.

The method of analysis consisted of a deductive approach to compare patterns between the results of the literature study and the empirical study. Each empirical research question has its own steps with regard to the method of analysis. The steps for the second research question were reducing the amount of guidelines, creating the categories to analyze the information, extracting the data from the recordings and adding to the categories, using the Fleiss' Kappa coefficient to determine the degree of agreement of the guideline per section and evaluate the corresponding criteria. For the third research question the steps were comparing the results of each section to check for commonalities and differences, calculation of the Cronbach's α to determine the reliability and calculation of the Fleiss' Kappa coefficient to determine the inter-rater reliability for combinations of sections.

Results

In total 105 guidelines were derived from literature. The first phase of the single embedded case study focused on determining which of these guidelines were definitely not applicable for Marel or which guidelines could be combined. This resulted in a list that contained 73 guidelines which needed to be valued in the second phase. In the second phase also improvements were suggested. In the third phase the improvements were rated and the interview data was validated. Via the Fleiss'

kappa coefficient the inter-rater reliability of the interview data was calculated per section. Also the average value of the guidelines per section and per topic was calculated.

To be able to answer research question three, the 73 guidelines that were derived from the single embedded case study had to be valued. Via the Fleiss' kappa coefficient the inter-rater reliability is calculated for all managers and for combinations of sections. Also the reliability of the data is calculated via the Cronbach's α. The average value of each guideline was determined for all managers, which resulted in 72 valid guidelines according to this analysis.

Conclusion
The first research question was answered via the literature review and resulted in 105 guidelines divided over 7 different topics.

Via the first phase of the single embedded case study these 105 guidelines were reduced to 73. Within the second phase the alternative guidelines were rated. One of the chosen alternative guidelines suggested splitting up the original guideline into two new ones. Therefore the amount of guidelines was increased to 74. Next the Fleiss' kappa coefficient per section was calculated to determine the inter-rater reliability. The result of this calculation was that the inter-rater reliability was very low. This is because the calculation takes into consideration the chance that the results are rated completely randomly. However the managers were specifically asked to support their opinion with criteria why the guideline is valuable. Therefore the chance that they rate completely randomly will be very low, which means that this coefficient cannot be used to determine the inter-rater reliability per section. Then the value of the guidelines per section and per topic was calculated. This was calculated based on the results of the first phase of the single embedded case study (figure 3). All topics are valuable, however not all guidelines are valuable. In total 26 guidelines needed further investigation and two of them were considered not to be valuable based on the given criteria, which resulted in 71 valuable guidelines for this analysis. As figure 3 shows, both analysis together results in 72 valuable guidelines that form the result for research question two.

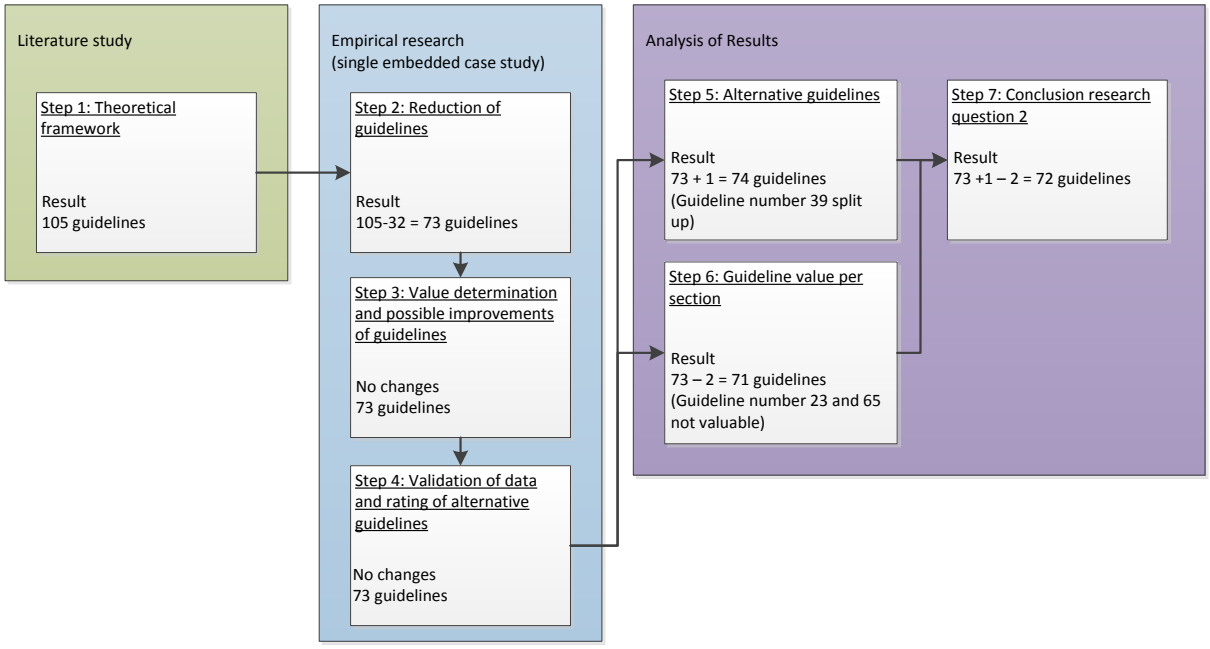

Figure 3: Amount of guidelines per step to answer research question 2

Next the Cronbach's α was calculated for all valued guidelines from the first phase of the single embedded case study. The Cronbach's α showed that the answers were acceptable as the Cronbach's α is 0,749 for the 73 guidelines. This means that the internal consistency of the answers is acceptable. Then the Fleiss' kappa coefficient, inter-rater reliability, was calculated for combination of sections and all sections together. The result was that the inter-rater reliability was very low for all of these calculations. Due to the same reasons as the previous Fleiss' kappa analysis, this coefficient cannot be used to determine the inter-rater reliability. Also the value of the guidelines for all sections together was calculated. In total 72 of the 73 guidelines were valuable and only one needed further investigation according to this analysis. The one that needed further investigation was also in the same category within the analysis for the second research question. Based on the criteria this guideline is considered not to be valuable, which was also the conclusion for this guideline in the analysis for research question two. This means that only 72 guidelines are valuable according to this analysis.

By combining these results together with the results of the second research question, the final result is 72 valuable guidelines (figure 4). This provides the answer to research question three, and means that objective of this research is accomplished.

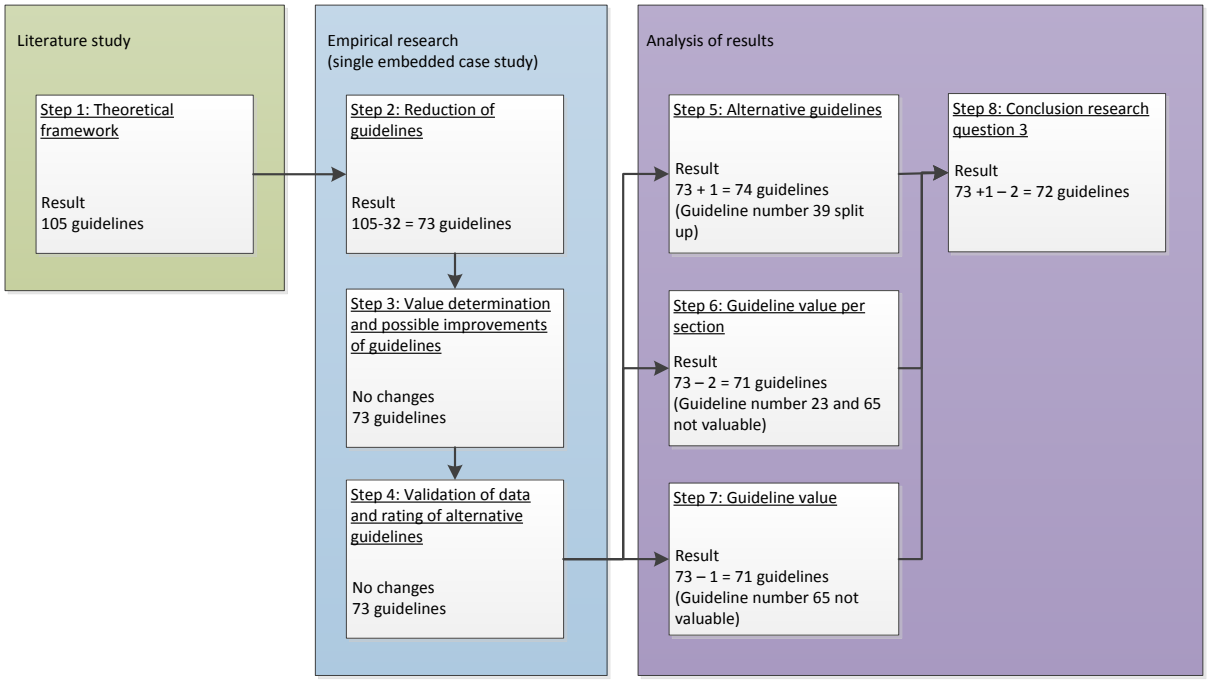

Figure 4: Amount of guidelines per step to answer research question 3

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1 Introduction

Alignment between business and IT and between strategic and tactical level is still a challenge for many companies (Chan & Reich, 2007; Max Saunders, Mann, & Smith, 2008; Schaap, 2012). This is also the case for Marel, which is the company where this research has been conducted. According to literature EAM can improve this alignment (Löhe & Legner, 2014). However clear guidelines were still missing.

In this chapter, first the problem is stated, followed by the business context. In the next paragraph the theoretical background is described. Then the research objective is described, which is followed by the research questions and research model. This chapter concludes with an outline of the thesis.

1.1 Problem statement

Currently Marel is working on becoming "One Marel". Because of the huge diversity between the entities it is important that the boundaries and principles are clear and communicated from strategic to tactical to operational level. Currently these boundaries and principles are not unambiguous and can be interpreted in many ways. It is as looking at a picture; everybody sees something different in it. Therefore the understanding of the picture must be managed in a way that everybody has the same view on it. This also counts for the boundaries and principles at Marel. Besides this problem there is also an alignment gap between business and IT due to the different way that projects are being executed by different entities. There is often a mismatch between what the business expects and what IT delivers. Therefore this alignment can be improved.

Due to all the acquisitions and the differences in the inherited vision, culture, IT landscape, size and technology orientation it is very clear that there is a misalignment between strategic and tactical level and between business and IT. Therefore Marel needs to change and Enterprise Architecture Management (EAM) is a discipline to guide this change (Löhe & Legner, 2014). The transformation must be realized on strategic, tactical and operational level and within business and IT (figure 5). However this research will focus on the alignment between strategic and tactical level and between business and IT of Marel only. This is symbolized by the red circle in figure 5.

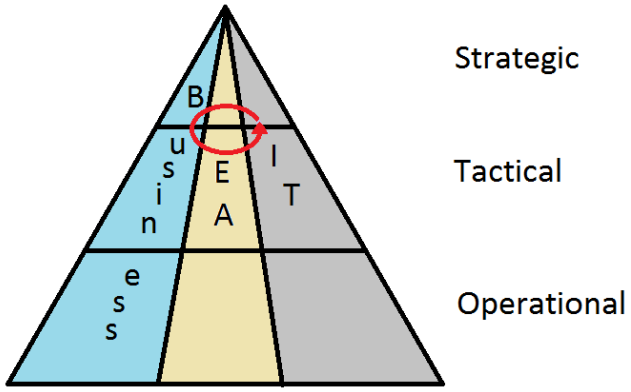


Figure 5: Alignment triangle

Improving alignment between business and IT as well as between strategic and tactical level is not only a challenge within Marel, but also a challenge for many other companies. As EAM is seen as a discipline to improve the alignment and it is important to know what guidelines are needed to facilitate this.

1.2 Business context

As mentioned, this research will be conducted at Marel. Marel is a multinational company that employs approximately 4,000 employees worldwide and has offices and subsidiaries in over 30 countries. Marel has a network of agents and distributors, and manufacturing facilities across the globe. Marel's mission is "to be the customers' choice in supplying integrated systems, products and services to the fish, meat and poultry industries".

Marel made many acquisitions all over the world. This resulted in a company with many different cultures and entities of different size and maturity. Each of these entities had their own vision on how to do business and also had their own IT departments and IT solutions. As an example this resulted in many different ERP and CRM systems without alignment. Currently this is already changing as Marel is in the transition in becoming more "One Marel". However the business transformation to become "One Marel" is still far from complete. The different entities also deal with different market segments. These market segments have their own characteristics and require different technical and technological solutions. For example the poultry segment is still very mechanically oriented. The related machinery is mechanically matured and very sophisticated. The end of line segment is mainly software oriented.

1.3 Theoretical background

Alignment between business and IT has been ranked as a major executive concern over the past two decades (Chan & Reich, 2007). Misalignment between business and IT leads to a decrease in performance compared to companies that have successfully aligned their business and IT (Chan & Reich, 2007). Differently stated, business and IT alignment can create strategic competitive advantages (Luftman & Brier, 1999). It is also considered to be a critical factor in realizing value from IT investments (Seppanen, Heikkila, & Liimatainen, 2009; Tarafdar & Qrunfleh, 2010).This can be enabled by alignment challenges related to knowledge, unknown corporate strategy, lack of awareness or belief in the importance of alignment, not enough business and industry knowledge or organizational change (Chan & Reich, 2007). However too tight alignment can cause inflexibility when the business environment changes (Chan & Reich, 2007). A prerequisite for high alignment is the collaboration of business and IT staff at all levels of an organization and commitment from top management. According to Tarafdar there is still a lack of practice-based guidelines for managerial actions at the tactical level (Tarafdar & Qrunfleh, 2009). An issue that has influence on the collaboration is the lack of a common language (Chan & Reich, 2007). Due to not implementing strategies throughout the company leads to system implementation difficulties. Many researchers state that Enterprise Architecture Management (EAM) is seen as a discipline to align business and IT (Löhe & Legner, 2014; Matthes, Buckl, Leitel, & Schweda, 2008; Radeke, 2011; Simon, Fischbach, & Schoder, 2014; K. Winter, Buckl, Matthes, & Schweda, 2010).

According to Saunders, "some researchers noted that organizations fail to implement up to 70 percent of their strategic initiatives" (Max Saunders et al., 2008; Schaap, 2012). Most managers know a lot about developing strategy, however executing or implementing of strategic initiatives is challenging and business strategy is useless without the implementation of it (Hrebiniak, 2006; Schaap, 2012). Effective execution of strategic initiatives is a key factor that divide the successful companies from the unsuccessful ones (Cocks, 2010; Hrebiniak, 2006). To be able to be successful, involvement of managers at all levels of the organization is necessary (Schaap, 2012). Cocks and Salih & Doll mentioned that failing in communicating the strategy will lead to misinterpretation and

strategy execution failure (Cocks, 2010; Salih & Doll, 2013). Not involving middle management in the strategy creation will lead to people being less enthusiastic about implementing something that they didn't have a voice in (Cocks, 2010; Salih & Doll, 2013). Additionally, the role of middle managers as change agents grows when organizations become global and more complex (Salih & Doll, 2013). Middle management plays an important role in the internal communication and effective internal communication will lead to positive outcomes(Salih & Doll, 2013). Middle management can also advise executive management on strategic initiatives as they are closely connected to the operational processes, market trends and internal capabilities (Salih & Doll, 2013). One of the obstacles mentioned by Salih and Doll is the ineffective management of change. This is in line with the first obstacle mentioned by Hrebiniak (Hrebiniak, 2006). According to Hrebiniak there are six obstacles to strategy execution which are: Inability to manage change effectively, poor or vague strategy, not having a model to guide implementation efforts, poor or inadequate information sharing and unclear responsibility and accountability and working against the power structure (Hrebiniak, 2006). Not within this list is the obstacle that there is not enough sense of urgency within the business (Kotter, 1995). People need to be motivated otherwise the change effort will fail. And communication plays also an important role during the change. According to Saunders recurring subjects that have a big influence on strategy implementation are communication, people, alignment, the influence of organizational values and learning (Max Saunders et al., 2008).

Enterprise architecture (EA) is only a few decades around and is mainly focusing on models, principles and standards (Schmidt & Buxmann, 2011; R. Winter, Legner, & Fischbach, 2014). While companies are implementing EA concepts they became more and more aware of the importance of the management side of EA and its success factors. This resulted in EAM, which is a young and immature discipline (R. Winter et al., 2014). Theoretically grounded research on how to practice EAM is quite limited (R. Winter et al., 2014). Currently there is no generally accepted definition of EAM. This research however will use the definition created by Winter et al., which is "EAM is a continuous, iterative (and self-maintaining) process seeking to improve the alignment of business and IT in an (virtual) enterprise. Based on a holistic perspective on the enterprise furnished with information from other enterprise level management processes it provides input to, exerts control over, and defines guidelines for other enterprise level management functions" (K. Winter et al., 2010). Löhe and Legner advises to not only implement EAM into IT management but also in other management structures and processes (Löhe & Legner, 2014). It should in fact be implemented in all management levels, strategic, tactical and operational as well as within business as IT (Henderson & Venkatraman, 1993; Matthes et al., 2008; Nikpay, Selamat, Rouhani, & Nikfard, 2013; Steenbergen, 2011). This means that executive management (strategic level) must be aligned with middle management (tactical level).

1.4 Objective

In order to contribute both to the academic literature and to provide a solution proposition for Marel, the main objective of this exploratory research is to:

> *Develop and improve enterprise architecture management guidelines to manage the alignment between business and IT and between strategic and tactical level.*

A first set of guidelines should help Marel in improving the business and IT alignment and strategic and tactical alignment and will contribute in becoming "One Marel". By achieving this main objective another important objective should be fulfilled, namely contributing to the academic literature.

1.5 Research questions

To be able to fulfill the objective, the following main research questions need to be answered:

RQ 1: Which EAM guidelines need to be developed to manage business and IT alignment and the alignment of strategic and tactical level, based on theoretical research?

RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?

RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?

These three research questions are based on the research model (figure 6), which is described in the next paragraph. The first research question is answered via literature research and is represented in the conceptual research model by the yellow blocks. The second and third research questions will be answered via empirical research. Within the conceptual research model the blue blocks represent research question two and the orange blocks represent research question 3. To be able to answer these research questions, the sub questions as listed in table 1 need to be answered.

Table 1 Sub questions per empirical research question

Research questions	Sub questions
RQ 1: Which EAM guidelines need to be developed to manage business and IT alignment and the alignment of strategic and tactical level, based on theoretical research?	SRQ 1: Which guidelines can EAM provide?
	SRQ 2: Which guidelines are needed to align business and IT?
	SRQ 3: Which guidelines are needed to align strategic and tactical level?
RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?	SRQ 4: What are the criteria needed to determine the value of the guidelines according to the four sections within Marel management?
	SRQ 5: What is the value of the guidelines according to the four sections within Marel management?
	SRQ 6: What can be improved on the EAM guidelines according to Marel management?
RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?	

1.6 Research approach

The research approach for this project is the formulative research approach. This research approach is chosen as it focusses on development of for example frameworks (Baas, Lemmen, & Barendsen, 2016). This matches with this research as this research is aiming to develop EAM guidelines.

The research approach consists of three main stages which are: the literature study, the empirical research and the analysis of the results. These three stages should lead to the final outcome. The following research model (figure 6) describes the corresponding structure and shows the relationship of the literature study with the empirical research, analysis and the final outcome (Verschuren & Doorewaard, 2007).

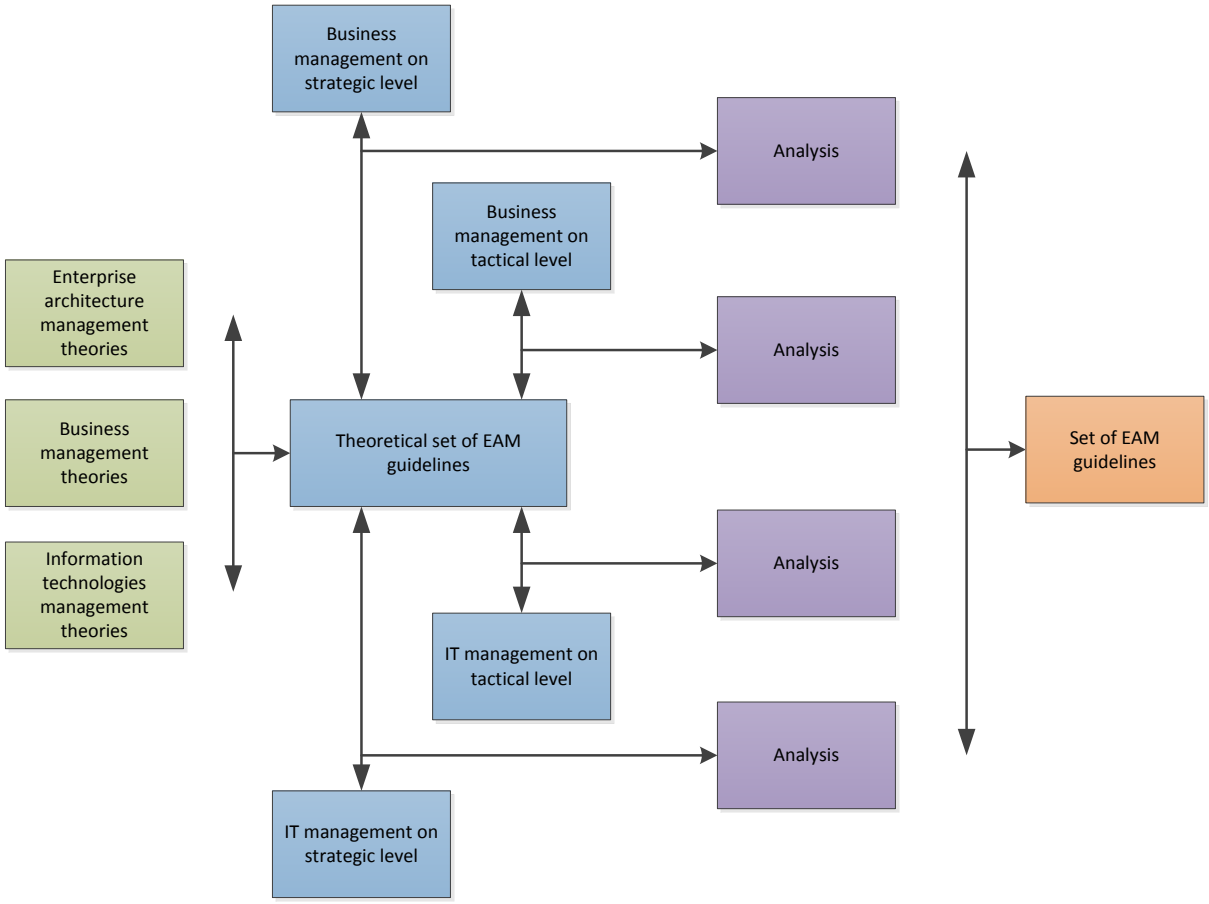


Figure 6: Research model

The research model can be explained as follows. (a) An investigation of management theories of enterprise architecture, business and IT, should supply a theoretical set of EAM guidelines, (b) which should be valued by the sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level. (c) An equation of the results of the four analyses will result in (d) a first set of guidelines for EAM.

Subsequently the following process is used to be able to execute this research. This process also contains the three stages literature study, empirical research and analysis of the results. Within the literature study one step was executed with the aim of developing a theoretical framework. Within the empirical research three steps were executed. The first step was to reduce the amount of

guidelines derived from the literature. The next step was to determine the value of these guidelines and to address possible improvements. The final step of this stage was to validate the data and to rate alternative guidelines. Within the stage, analysis of the results, four steps were executed. The first step was to analyze which alternative guidelines were most valued. Next the guideline values per section were analyzed followed by an analysis of all guideline values. Combining these results leads to the conclusion of the research. Figure 7 provides a visual over view of this process.

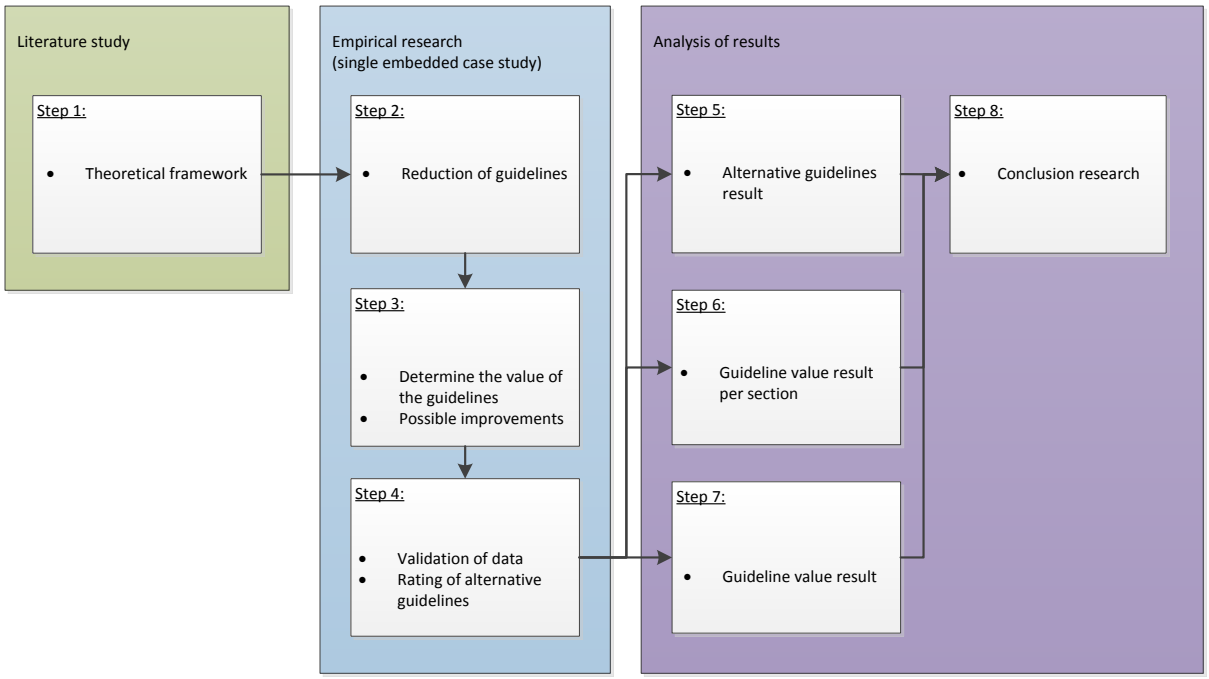


Figure 7: Research process

1.7 Thesis outline

This document is organized as follows; chapter two describes the methodology and results of the literature study. The research approach is described in chapter 3. The results of this, the empirical research, can be found within chapter 4 and chapter 5 provides the conclusion.

2 Theoretical EAM guideline framework

This chapter describes which guidelines are needed within EAM to align business and IT and to align strategic and tactical level. An exhaustive study is conducted to find existing guidelines. Only within the research area of business management, guidelines were found for the alignment of strategic and tactical level. Within the research areas EAM and IT management there were no guidelines found for the alignment of business and IT or strategic and tactical alignment. However factors, critical success factors, processes, practices and tasks were found from which guidelines could be conducted. The result of this study is a theoretical framework that describes these guidelines. Therefore this framework will provide the answer to research question one:

RQ 1: Which EAM guidelines need to be developed to manage business and IT alignment and the alignment of strategic and tactical level, based on theoretical research?

2.1 Methodology

The methodology consists of the following elements: Search strategy, selection criteria and resources (Mark Saunders, Lewis, Thornhill, Booij, & Verckens, 2011). It was an iterative process that had many cycles to ensure an executable research scope.

2.1.1 Search strategy

To be able to answer the research question, guidelines are needed to align business and IT and to align strategic and tactical level. These guidelines should be found within the research domain "Enterprise Architecture Management", "Business Management" and "IT management". The OU search portal and google scholar were used to search for relevant literature. Only published literature in the time frame from 1990 till 2015 was used because only as of the early 90's EA became more important. Because of the international character of the subject, there were no restrictions in regards to the geographical location and only scientific articles in English were used.

Two search methods were used to find the right articles. The first search was based on keywords. Via a brainstorm session the keywords per sub question were created. A complete overview of the keywords is listed in appendix B. Many articles were found and added to the repository of relevant articles. Parts of these articles were very interesting and were copied into a separate document together with relevant references. The second search was based on the snowball method, which used these references. Based on the relevance of these articles, accompanying references were read. Via the cited by functionality in google search, more recently published articles were found based on the previously found articles, this to ensure that the latest articles about the subjects were read.

2.1.2 Selection criteria

Two article scans were necessary to determine the relevance of an article. The first scan consisted of reading the abstract and conclusion. The outcome of this scan determined if an article was relevant or not. If the article had no connection with the problem statement than the article was not used for further investigation. Only the relevant articles were listed in the repository. The repository used within this study was an Endnote library. The second scan was a quick scan through the complete article to determine the relevance for one of the sub research questions. In case this was the case the article was fully read and relevant references were noted as well. An overview of these references can be found in appendix C.

2.1.3 Resources

From the in total 115 scanned articles only 31 were actually used for describing the problem statement from a scientific view and to answer the research question. Also for definition purposes, not scientific references were used due to the fact that the definition was not found within literature used for this research. An overview of the amount of scientific references used per sub question can be found in appendix C.

2.2 Guidelines to align business and IT

Within literature no guidelines were found to align business and IT. However many topics, like factors, antecedents, practices, components or processes were found. The guidelines were extracted based on the topics from the corresponding literature.

2.2.1 Definition of business and IT alignment

Many authors provided a definition for business and IT alignment. An evaluation of these definitions can be found in appendix D. One of the definitions that is used often according to Luftman, Papp and Brier is “applying information technology (IT) in an appropriate and timely way, in harmony with business strategies, goals and needs” (Luftman, Papp, & Brier, 1999). Tarafdar and Qrunfleh have two statements for business and IT alignment, of which the second one has a strong relation to tactical alignment. Their second statement is “IT-business alignment at the tactical level is accomplished when planned applications are implemented and business benefits from them are realized. Processes for tactical alignment should facilitate operational level linkages between IT and the functions vis-à-vis application implementation projects, technology choices, resource allocations, and skill requirements, and synchronization of management, delivery and governance strategies between IT and business.” (Tarafdar & Qrunfleh, 2010). Therefore the definition of Luftman, Papp and Brier is used and complemented with a part of the tactical level statement of Tarafdar and Qrunfleh as it also reflects the scope of this research. This results in the following definition for business and IT alignment:

“Applying information technology (IT) in an appropriate and timely way, in harmony with business strategies, goals and needs, via processes that facilitate operational level linkages between IT and the functions vis-à-vis application implementation projects, technology choices, resource allocations, and skill requirements, and synchronization of management, delivery and governance strategies between IT and business.”

2.2.2 Business and IT alignment topics

First of all it is important to distinguish the different organizational levels where alignment between business and IT takes place. These levels are strategic, tactical and operational (Charoensuk, Wongsurawat, & Khang, 2014; Tarafdar & Qrunfleh, 2009, 2010). Second of all some authors base the alignment on factors, antecedents, practices, components or processes. For readability of this document the group of these factors, antecedents, practices, components and processes will be called business and IT alignment topics.

In total two articles were found about business and IT alignment on tactical level. Both articles are from Tarafdar and Qrenfleh. The article from 2010 contained six alignment aspects and the article from 2009 contained five processes (Tarafdar & Qrunfleh, 2009, 2010). Also four articles were found about business and IT alignment on strategic level. Chan and Reich write about three factors and twelve critical success factors (Chan & Reich, 2007). According to Luftman et al. there are six enablers, six processes and twelve components for business and IT alignment on strategic level (Luftman et al., 1999) and Tarafdar and Qrunfleh describe three processes (Tarafdar & Qrunfleh, 2009). There is also an article of Chan that contains four factors for aligning business and IS strategies (Chan, 2002). In this document are also six structural alignment factors mentioned. These are not specific for a certain level. There are also three other articles that contain antecedents or practices that are not level specific. One of these articles is from Charoensuk, Wongsurawat and Khang. They mention that there are five antecedents for business IT alignment (Charoensuk et al., 2014). According to Farrel there are three categories, each with their management practices, which are in total 21 practices (Farrell, 2003). Huang, Wu and Chen also define management practices, however they have five practices (Huang, Wu, & Chen, 2013).

Due to the huge diversity of business and IT alignment topics it is important to find the most important topics. Unfortunately no article is found that investigated the relevancy of these topics. Therefor the topics are chosen based on the amounts that they are cited. Table 2 shows the topics for business and IT alignment. A complete matrix of all the business and IT alignment topics per author can be found in appendix E.

Table 2 Main topics for business and IT alignment

Topic	**Amount cited**
Communication	5
Planning	4
Commitment	4
Skills	4
Projects	4

2.2.3 Extracted guidelines

For each of the main topics guidelines were extracted. The difference in the amount of guidelines per topic is huge. For example the topics 'planning' and 'commitment' only contain one extracted guideline and topic 'projects' contains 13 guidelines. Table 3 shows per topic the amount of guidelines that were extracted from literature. A complete list of all business and IT alignment guidelines per topic can be found in appendix F.

Table 3 Amount of guidelines per business and IT alignment topic

Topic	Amount of guidelines
Communication	4
Planning	1
Commitment	1
Skills	2
Projects	13

2.3 Guidelines to align strategic and tactical level

This chapter describes the definition of strategic level, tactical level and strategic and tactical alignment followed by the guidelines that are available in literature to align strategic and tactical level.

2.3.1 Definition of strategic and tactical level

No clear definition is provided by the literature about strategic and tactical level. Steenbergen mentions about the strategic level that "at strategic level the architect interacts with senior management on fundamental strategic choices for the organization" (Steenbergen, 2011). According to Businessdictionary.com senior management is "A group of high level executives that actively participate in the daily supervision, planning and administrative processes required by a business to help meet its objectives. The senior management of a company is often appointed by the corporation's board of directors and approved by stockholders" and strategy is "a method or plan chosen to bring about a desired future such as achievement of a goal or solution to a problem" (Business dictionary, 2015). Therefore the definition for strategic level will be:

"The strategic level is the senior management that consists of high level executives, which create strategic choices for the organization to achieve the business goals."

The definition for tactical level will be:

"The tactical level is the management level that is involving or pertaining to actions, ends, or means that are immediate or short-term in duration, and/or lesser in importance or magnitude, than those of strategy or a larger purpose." (Business dictionary, 2015)

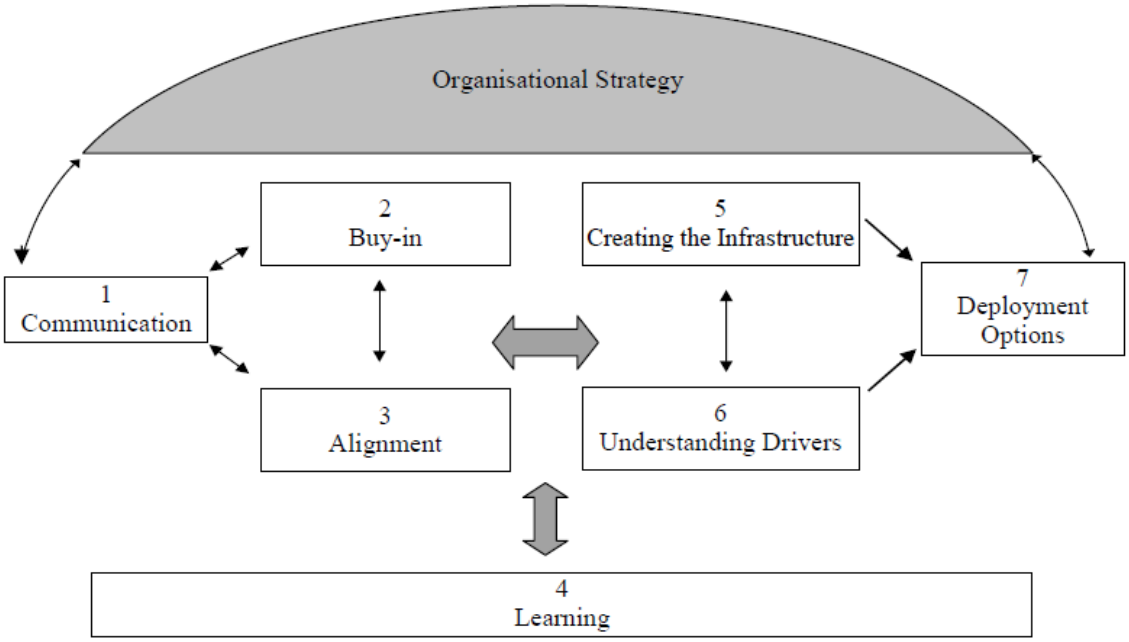
2.3.2 Definition of strategic and tactical alignment

Within literature there is no clear definition for strategic and tactical alignment. Therefore the definition provided by the business dictionary website is used for strategic alignment, which is:

"The process of bringing the actions of an organization's business divisions and staff members into line with the organization's planned objectives. The ability of most businesses to achieve their strategic goals will benefit from performing a comprehensive strategic alignment to help assure that its divisions and employees are jointly working toward the company's stated goals." (Business dictionary, 2015)

2.3.3 Guidelines for strategic and tactical alignment

Within literature six articles were found about strategic and tactical alignment. Unfortunately the topics mentioned in these articles are very diverse. However Saunders, Mann and Smith describe the guidelines extensively and cover most of the topics mentioned by other researchers. The main topics Saunders, Mann and Smith use are; 'communicating the initiative', 'achieve buy-in', 'aligning implementation', 'learning', 'creating the infrastructure', 'understanding the business drivers' and 'identifying deployment options' (Max Saunders et al., 2008). These topics are captured in a framework as presented by figure 8. A complete matrix of all topics about strategic and tactical alignment per author can be found in appendix G.



Notes: Constructs 1-3 are associated with soft management practices and constructs 5-7 with hard practices. The learning construct interacts with all the others

Figure 8: Framework for strategy deployment (Max Saunders et al., 2008)

Due to the completeness of the framework, the guidelines that are extracted from the other articles can be assigned to one of the topics of the framework. Appendix H contains the complete list of all guidelines regarding strategic and tactical alignment per topic.

2.4 EAM specific guidelines

Within literature no EAM guidelines were found. However factors, critical success factors, processes, practices and tasks that are specific for EAM were found, whereof guidelines have been extracted.

2.4.1 Definition of EAM

Within literature several different definitions are given for EAM. Unfortunately no general accepted definition is available. In total five definitions were found and evaluated based on how well they match with the research subject. These definitions with evaluation can be found in appendix D. Due to the focus on business IT alignment and guidelines for other enterprise management functions, the definition of Winter et al. is the most appropriate one for this research. Their definition is:

"EAM is a continuous, iterative (and self-maintaining) process seeking to improve the alignment of business and IT in an (virtual) enterprise. Based on a holistic perspective on the enterprise furnished with information from other enterprise level management processes it provides input to, exerts control over, and defines guidelines for other enterprise level management functions." (K. Winter et al., 2010)

2.4.2 Definition of a guideline

First of all it is important to know what is meant with a guideline. Within literature about EAM there was no definition given about what was meant with a guideline. Therefore the definition of businessdictionary.com will be used:

"Recommended practice that allows some discretion or leeway in its interpretation, implementation, or use." (Business dictionary, 2015)

To even better understand this definition the meaning of practice must also be clear. According to the businessdictionary.com the definition for practice is:

"A method, procedure, process or rule used in a particular field or profession; a set of these regarded as standard." (Business dictionary, 2015)

2.4.3 EAM topics

In total nine articles were found that described factors, critical success factors, processes, practices or tasks that are specific for EAM. These factors, critical success factors, processes, practices and tasks for EAM will be called EAM topics throughout this document. Some topics are related to each other, like "training and education" and "in adequate resources or skills". However only the clearly referenced topics are being used in this document. Appendix I contains a complete matrix of all 40 EAM topics found in literature grouped by author.

The diversity among the EAM topics is huge. Therefore it is important to find the most important topics for EAM. According to Schmidt and Buxmann, who conducted a quantitative field study, EA 'governance' is the most important topic, followed by 'communication' and 'stakeholder participation' (Schmidt & Buxmann, 2011). 'Stakeholder participation' can be seen as creating the

right ‘commitment’. The next most important topic according to Schmidt and Buxmann is ‘EA implementation’ which can be compared to the ‘planning’ topic referred by other researchers (Schmidt & Buxmann, 2011). The results match for a part with the topics that are cited the most. Because the topics ‘skills’, ‘development and maintenance of architecture models’ and ‘methodology’ are also cited three times these will also be used within this research and are in the same order as in the architecture capability framework of Togaf 9 (Open_Group, 2009). The most important topics are shown in Table 4.

Table 4 Main EAM topics

Topic	Amount cited
EA Governance	6
Communication	4
Commitment	3
Planning	5
Methodology	3
Development and maintenance of architecture models	4
Skills	3

2.4.4 Extracted EAM guidelines

As mentioned before, EAM topics consists of factors, critical success factors, processes, practices and tasks. Processes and practices are very similar to guidelines and therefore the corresponding articles are being used to capture the right guidelines for EAM. However the level of detail that researchers use to describe the topic is very different. Table 5 shows per topic the amount of guidelines that were extracted from literature. A complete list of all EAM guidelines per topic can be found in appendix J.

Table 5 Amount of guidelines per EAM topic

Topic	Amount of guidelines
EA Governance	5
Communication	3
Commitment	2
Planning	5
Methodology	2
Development and maintenance of architecture models	4
Skills	2

2.5 Conclusion

Evaluating the topics of EAM, business and IT alignment and strategic and tactical alignment, there are many commonalities. One of these commonalities is ‘communication’, which occurs within all three areas. Another example of a commonality is ‘commitment’, which is called ‘commitment’ within the EAM and business and IT alignment area and matches with the ‘buy-in’ topic of the strategic and alignment area. Table 6 provides a complete overview of the topics that can be aligned between EAM, business and IT alignment and strategic and tactical alignment.

Table 6 Aligned topics

EAM topics	Business & IT alignment topics	Strategic and tactical alignment topics
EA governance		Creating the infrastructure
Communication	Communication	Communication
Planning	Planning	Deployment options
Commitment	Commitment	Buy-in
Skills	Skills	Learning
Development and maintenance of architecture models		Understanding the business drivers
Methodology		

The business and IT alignment topic 'projects' could not be completely mapped to one of the EAM topics. However the guidelines of this topic can be mapped to the EAM topics. The same counts for the strategic and tactical alignment topic 'alignment'. Appendix K provides an overview of the guidelines and their corresponding EAM topics. In total 105 guidelines were derived from literature. The complete list of guidelines can be found in appendix L.

Based on the EAM topics and guidelines a framework is developed (figure 9), which is distracted from the framework for strategy deployment of Saunders, Mann and Smith (Max Saunders et al., 2008). The triangle represents the business which consists of a strategic and tactical level and business and IT. The vertical axis represents the strategic and tactical connection that needs to be aligned and the horizontal axis represents the business and IT connection that needs to be aligned. In the middle the EAM guideline topics are shown with on the left side the soft topics and on the right side the hard topics, both supported by the skills topic. The numbering of the topics is based on the importance. This framework with the corresponding guidelines provides the answer to research question 1.

RQ 1: Which EAM guidelines need to be developed to manage business and IT alignment and the alignment of strategic and tactical level, based on theoretical research?

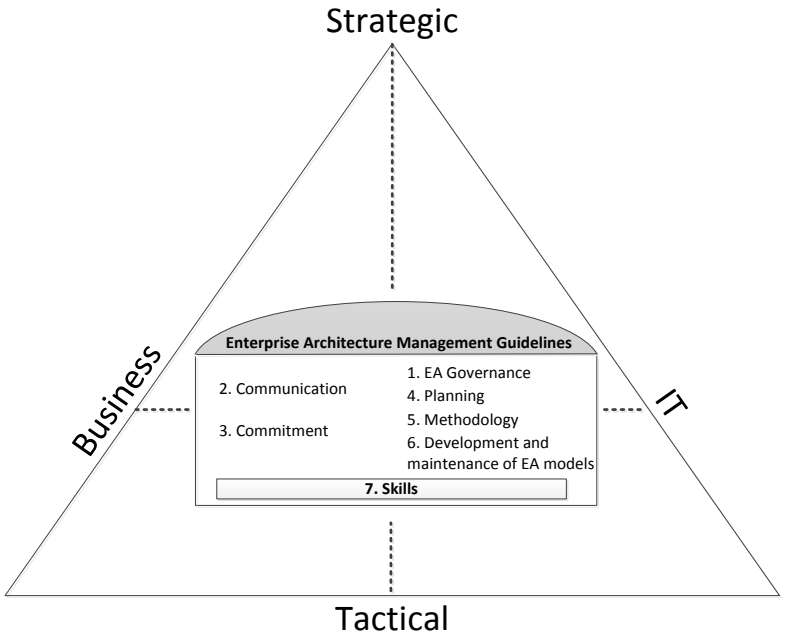


Figure 9: Framework for EAM guidelines

3 Empirical research

The aim of this chapter is to describe the research approach for testing the theoretical framework empirically by finding an answer to research question two and three. The research approach consists of the research strategy, data and data sources, methods and techniques, validity and reliability and methods of analysis.

RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?

RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?

3.1 Methodology

For testing the theoretical framework, empirical data is collected. This data is collected via a single embedded case study. A single embedded case study is used because this research is conducted only at Marel and because the unit of analysis consisted of the four sections; business executive management, IT executive management, business middle management and IT middle management (Mark Saunders et al., 2011). Executive management operates on strategic level and middle management operates on tactical level. Figure 10 resembles the four sections in relation to business IT alignment and strategic and tactical alignment.

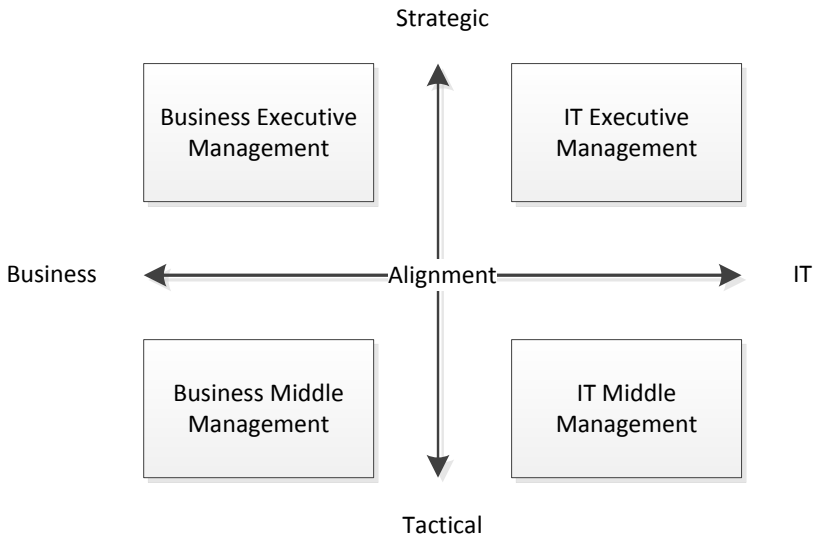


Figure 10: Sections

The advantage of the single embedded case study is that it can provide a good understanding of the context, which matches the exploratory character of this research (Mark Saunders et al., 2011). Therefore the nature of this research is qualitative as qualitative data is gathered instead of quantitative data. Quantitative research does not fit due to the fact that interaction between the manager and researcher is necessary to gather the value, reasoning and possible improvement for each guideline. In depth questions were necessary as most of the managers are unfamiliar with EAM and because the managers were asked for practical situations to explain the value, reasoning and possible improvement.

Figure 11 provides a visual overview of the steps that need to be taken during this research. The blue section of figure 11 shows where the single embedded case study is positioned within this research. As shown in this figure, the single embedded case study consisted of three phases (Mark Saunders et al., 2011). The first phase reduced the amount of EAM guidelines by checking which guidelines could be combined and which were not applicable to Marel. This had to be done because the list contained 105 guidelines and to value and optionally improve each guideline would have costed too much time for the timeframe of the interviews and this research. The second phase was to value and improve the theoretical framework and corresponding guidelines. The third phase was to get feedback on the first analysis based on the data received during the second phase.

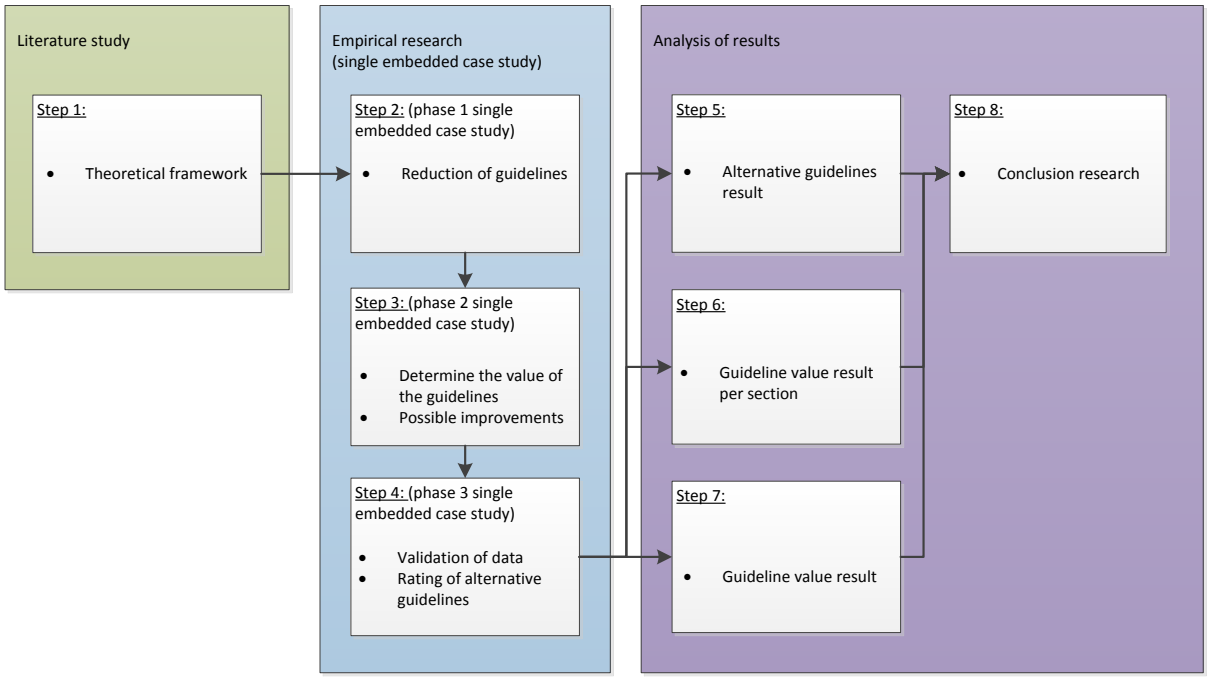


Figure 11: Research process

3.2 Data and data sources

For research question 2, primary data was gathered. The primary data consisted of a value determination for the guidelines and for the framework. The value determination is supported by criteria and corresponding reasoning. There is no secondary data gathered, because there is no documentation or questionnaires available within Marel regarding this research subject. The scope of this research is alignment between business and IT and executive (strategic level) and middle management (tactical level), therefore the population consists of managers that are positioned in executive and middle management on business side as well as on IT side. The managers that were interviewed were able to value the framework and guidelines, because they are experts in practical situations regarding business and IT alignment and strategic and tactical alignment.

RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?

Based on the research strategy and the four sections, a strategic non-stochastic random sample method was used (Mark Saunders et al., 2011). A non-stochastic random sample method is used because this research is based on a single embedded case study. The nature is strategic because the managers were selected based on the research questions. Within each section four managers were chosen, except for the section IT executive management as there are only two managers available within Marel (table 7). The reason for asking a maximum of four managers per section is to be able to achieve the research within the timeframe. Marel's main locations are Gardabaer (Iceland) and Boxmeer (the Netherlands) and most of the executive managers are located at one of these locations. Also many middle managers are located at both locations therefore the managers necessary for this research were chosen from these two locations only. Within the section business executive management, three Dutch managers and one Icelandic manager were selected. Within middle management on business side as well as on IT side, two Dutch managers and two Icelandic managers were selected. Within the IT executive management section one Dutch and one Icelandic manager were selected. The goal was to choose two managers per location to be able to compare if the managers from the same location and section share the same opinion. Within middle management this is possible as there are over 50 middle managers. The executive team however only consists of 12 managers. Therefore it is more difficult to find two Dutch managers and two Icelandic managers that are willing to cooperate in this research. Their time is very limited and expensive therefore it is important that these managers see the value in this research. Paragraph 3.3.1 explains the method used to achieve the cooperation of all managers.

Table 7 Managers per section

	Business	IT
Executive Management	4	2
Middle Management	4	4

Each phase (figure 11) of the single embedded case study required different resources. The first phase only required one manager from the business and two managers from IT side as the task of the first phase is extensive and time consuming. The manager from the business and one of the two managers from IT side were a member at strategic level with tactical level experience from the past. The other manager from IT side is well experienced with enterprise architecture. For the second and third phase all 14 managers were involved.

Within each phase of the single embedded case study questions were asked to retrieve the data needed for the analysis. Appendix M contains an overview per phase which questions were asked. The retrieved data is stored at different locations and is divided into the three phases of the single embedded case study. The first phase contains the contextual data and the interview registration regarding the reduction of guidelines. The second phase also contains contextual data and interview registration, but for determining the value and addressing the improvements of the guidelines. The third phase contains the received evaluation of the alternative guidelines and the approved interview registrations. An extensive explanation of the file types can be found in appendix N.

For research question 3, the results of the single embedded case study were used to finalize the EAM guideline framework and corresponding guidelines. For this research question, no additional resources were needed. The results of this research question were saved in six different files which contain the following information:

- Results alternative guidelines
- Results criteria
- Results Fleiss kappa
- Results percentages
- Results Cronbach's alpha
- First set of guidelines

An explanation of these files can be found in appendix N.

RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?

3.3 Data collection techniques

Several methods are used for research question 2. These methods are needed to get the cooperation of managers without forcing or influencing them, to gathering the qualitative data, to validate the data, to take the research ethics into abidance and a method to execute the interview. For research question 3, the methods will be described in paragraph 3.5 "Method of analysis".

3.3.1 Cooperation of managers

Getting the managers to cooperate is a big challenge, especially the members at executive management level as they are with only 12. They need to see the importance of this investigation, because their time is very limited. Therefore it is important to get their attention and to inform them in an effective and efficient way. The following steps were taken to get the managers to cooperate freely:

1. *An email was send with an explanation of who I am, what I am investigating, why I need their cooperation and what my plan is. This was short and concise. Within the email was asked if they are willing to cooperate with the research. Attached to the email was the final problem description where the manager could read all the details. Appendix O contains the email.*
2. *The managers that didn't confirm were called as it was possible that they missed the email.*
3. *In case the managers couldn't be reached by phone, contact was made via one of their direct colleagues.*

3.3.2 Semi-structured interviews

Via semi-structured interviews, management within Marel was interviewed in order to receive the empirical data needed for the data analysis (Mark Saunders et al., 2011). Semi-structured interviews were used because the subject EAM is unknown to most of the managers, who needed additional explanation. Also the theoretical framework and guidelines needed in some cases additional explanation due to their complex nature and because guideline changes emerged during the interviews. Before each interview, an email was send to the manager with information about EAM,

the guidelines and the framework. At the beginning of each interview a short presentation was given to ensure that the manager was prepared for the actual interview. The interviews were face-to-face to be able to ask in-depth questions based on body language as some managers reacted uncertain about some of the guidelines. The semi structured interview provided the opportunity to ask more in depth questions and provided the possibility to answer questions from the managers to get a better understanding of the subject.

In the first two phases of the single embedded case study a semi-structured interview was conducted (figure 12). The first phase focused on which guidelines were definitely not applicable for Marel or could be combined. The second phase focused on the value of the theoretical framework and guidelines and how to improve them. A detailed description of how the semi-structured interviews were executed and which questions were asked can be found in appendix P. All questions were verified by one IT middle management expert and one business executive management expert first, to check if these would be applicable and of a good quality to use. The retrieved data was stored in excel file per phase of the single embedded case study. An example of these excel files per phase can be found in appendix Q. There will be no triangulation within this research, because no secondary data is available about this subject within Marel and because no quantitative data will be collected due to the timeframe of this research.

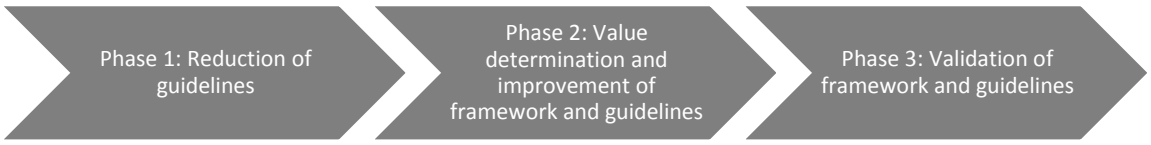


Figure 12: Three phases of the single embedded case study

3.3.3 Preparation and execution of the interview

A week before the interview an email was send with the theoretical framework, corresponding guidelines and questions that were asked during the interview. The manager was able to use this to prepare for the interview. The interview started with a presentation to inform the manager about the research so they were well prepared. Topics used in the presentation were; introduction, goal of the research, problem statement, research questions, possible benefits for Marel, definitions, results of the literature study, EAM topics, goal of the interview and goal of the analysis validation meeting. Then the manager was informed that he or she always has the right to refuse to answer. Also permission was asked for recording the interview. These recordings were used confidentially only by the researcher and will be destroyed when the research is finished as requested by Marel. The following step was to ask the questions, which will be different between phase one and two. When all questions about the conceptual EAM guideline framework and corresponding guidelines were answered the manager was thanked for his time and knowledge. In case not everything was covered an additional meeting was planned in agreement with the manager.

3.3.4 Data validation

The data received from the second phase of the single embedded case study together with the analyzed improvements, were validated within the third phase of the single embedded case study. The analysis of the improvements resulted in alternative guidelines that the manager had to value. An email was send to the managers with questions to get this value. A detailed description of how the validation was executed and which questions were asked can be found in appendix P. The questions were verified by two experts, to check if these had the right quality and would be applicable for this research.

3.3.5 Research ethics

Within each research it is important to guarantee research ethics. There are several research ethic topics that need to be considered while preparing and executing the research. Within this research the following topics were taken into abidance; damage to participants, pressure on participants to participate, informing of participant and asking for permission, data processing and storage, data collection, analysis and reporting (Mark Saunders et al., 2011). A full explanation about how these research ethics were applied during the research can be found in appendix R.

3.4 Validity and reliability

Due to the use of semi-structured interviews within this research the internal validity was increased by being able to explain the questions in more detail. This resulted in a better understanding of the questions by the manager. Also in depth questions about the subject were asked, which resulted in more valid answers and therefore increased the validity of this research. Another benefit is that the results will be accepted more by the field as the researcher had a less detached role.

As this is an exploratory research that is based on semi-structured interviews, it is not possible to generalize to the complete population of companies that match the same profile of Marel. However these results can be used for further investigation and have value wider than only this case as it is the first step in creating guidelines for EAM to improve the alignment between strategic and tactical level and between business and IT.

The reliability of the data was improved by capturing all steps taken by the researcher to ensure that other researcher can follow the choices that are made. These steps are described in this document, for example by explaining why the single embedded case study is chosen to be the research strategy. The reliability was also improved by reducing the interviewer bias and the respondent bias. The interviewer bias was reduced by planning how to prove the credibility of the researcher (Mark Saunders et al., 2011). The preconditions that were taken into account can be found in appendix S. The interviewer bias was also reduced by pre structuring the questions to guide the interview and to enable repetition by other researchers (Mark Saunders et al., 2011). The respondent bias was reduced by asking the manager only about the value of the guidelines and framework. The manager was asked to compare the current practical situation with the future practical situation when the guideline would be operational and explain what the benefit would be. The managers weren't asked questions about sensitive information regarding specific employees.

The reliability of the data was also improved by validating the framework and guidelines in phase three of the single embedded case study. The managers were asked to confirm if they agree with the analysis and if they don't agree, what needs to be changed.

3.5 Method of Analysis

Each empirical research question has its own steps with regard to the method of analysis. The steps for the second research question were reducing the amount of guidelines, creating the categories to analyze the information, extracting the data from the recordings and adding to the categories, using the Fleiss' Kappa coefficient to determine the degree of agreement of the guideline per section and evaluate the corresponding criteria. For the third research question the steps were comparing the results of each section to check for commonalities and differences, calculation of the Cronbach's α to determine the reliability and calculation of the Fleiss' Kappa coefficient for combinations of sections. This was used to create a first version of the framework together with the corresponding guidelines.

3.5.1 Second research question

The results of the interviews were used to answer the second research question. After each interview the recording was used to extract and structure the data to fill out the categories for the guidelines and for the framework. This data was stored in an excel file at a different location than the recording. The categories were used to limit the amount of research material and to find relationships between the data. For the first phase of the single embedded case study, which was about reducing the amount of guidelines, the categories valuable, combine and remove were used. For the second part of the single embedded case study the categories were; guideline, framework, topic, section, valuable, improvements and criteria regarding both strategic and tactical alignment and business and IT alignment. First the amount of guidelines was reduced. Second, the improvements were analyzed. This resulted in alternative guidelines that were valued by the managers. This was phase three of the single embedded case study. When the validation of the data was received then the data was stored in the previously mentioned excel file and was used for further analysis.

RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?

The first analysis was to analyze, which guideline is the most important one in case the guideline contains alternative guidelines. Table 8 provides an example of the calculation. In case a guideline contained two alternative guidelines, than the original guideline and the two alternative ones got points from each manager. The most important guideline got three points, the second most important got two points and the least important got one point. Guideline 1 in table 8 provides an example of this situation. The guideline that received the most points was used for further analysis. In the example the most important guideline is highlighted in orange. In case there was only one alternative guideline, the most important guideline got two points and the least important guideline got one point (guideline 2 and 3 in table 8). For guideline 2 the most important guideline will be the original guideline as this one received the most points. In case guidelines received an equal amount of points, as in guideline 3 of table 8, the guideline that was used for further analysis would depend on the given criteria. In case there are guidelines with more than two alternatives a consecutive point allocation should be used.

Table 8 Example of the most important guideline

	Manager	Original guideline	Alternative 1	Alternative 2
Guideline 1	1	2	1	3
	2	2	1	3
	3	1	3	2
	4	2	3	1
Sum		**7**	**8**	**9**
Guideline 2	1	1	2	
	2	2	1	
	3	2	1	
	4	2	1	
Sum		**7**	**5**	
Guideline 3	1	1	2	
	2	2	1	
	3	1	2	
	4	2	1	
Sum		**6**	**6**	

Via the Fleiss' kappa coefficient, the degree of agreement (inter-rater reliability) within each section was calculated (Fleiss, 1981). This means that it is possible to calculate how much managers within a section are aligned about, if a certain guideline or the framework is valuable or not. In case the managers of a section are aligned, then the inter-rater reliability is even increased, if the guidelines and framework are valuable or not. The data necessary for this analysis is the data that is stored in the category "valuable". This analysis is stored in the same excel files as where the data for each category is stored.

Per section the value of each guideline was determined. Appendix T provides an example of this calculation. In case 75% or more of the managers agreed that the guideline is valuable, than the guideline is considered to be important for that section. In case 25% or less of the managers agreed that the guideline is valuable, than the guideline is considered not to be important. In case less than 75% and more than 25% of the managers agreed that the guideline is important, than the guideline needs further investigation based on the criteria. The categories, >75%, 25%> <75% and <25% are chosen together with experts within Marel. This allocation formula is used in multiple analyses within this research in agreement with the experts. The procedure to value the framework is the same as the procedure for valuing the guidelines.

Also per section the value of a topic was analyzed, because it was possible that a certain topic is only important for a certain section. In case 75% or more of the guidelines in a topic were valuable according to the managers within a section, than the topic is considered to be important for that section. In case 25% or less of the guidelines in a topic were valuable according to the managers within a section, than the topic is considered not to be important for that section. In case less than 75% and more than 25% of the guidelines in a topic were valuable according to the managers within a section, than the topic needs further investigation based on the criteria. Based on the criteria some guidelines may still be valuable for Marel and others not.

The obtained criteria were compared for the guidelines that needed further investigation, to determine the reasons why a guideline was valuable or not.

3.5.2 Third research question

The results of the second research question were used to answer the third research question. Via the Fleiss' kappa coefficient the alignment within combinations of sections and within the complete research was determined. This analysis provides an overview of which sections are aligned and which not and the degree of alignment between all managers. These combinations are:

- *Executive management (combination of executive management business and executive management IT)*
- *Middle management (combination of middle management business and middle management IT)*
- *Business management (combination of executive management business and middle management IT)*
- *IT management (combination of executive management IT and middle management IT)*
- *Management (combination of all four sections)*

RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?

Even though this is a qualitative research the reliability of the answers for the question "is this a good guideline for Marel?" were calculated. This was done with the reliability coefficient, Cronbach's α (Ten Hacken, 2009). The analysis was executed with the software tool SPSS.

The value of the guidelines of each section was compared to each other, to check for differences. With this analysis it became clear which guidelines were more important for a certain section. Also the value of each guideline, section independent, was analyzed. In case 75% or more of the managers agreed that the guideline is valuable than this guideline is considered to be a valuable guideline for Marel. In case 25% or less of the managers agreed that the guideline is valuable than this guideline is considered not to be a valuable guideline for Marel. In case less than 75% and more than 25% of the managers agreed that the guideline is valuable than the corresponding criteria were checked to understand why certain managers think the guideline was valuable or not. Also the value of the framework was determined. The procedure to value the framework was the same as the procedure for valuing the guidelines. With these two analyses it became clear what must be done to create more alignment. These results are stored in the same file as the results of the second research question.

4 Results

From the in total 14 interviewed managers only the data of 12 managers were used for answering the research questions. One of the two managers didn't believe that guidelines would provide a benefit for the company. The other manager provided valuable information, but unfortunately the recording file became corrupt and the manager did not have the time to do the interview again. Table 9 shows the amount of managers per section, which resulted in a balance between the amount of business managers and IT managers.

Table 9 Managers per section

	Business	IT
Executive Management	3	2
Middle Management	3	4

Only 7 of the 12 managers valued the alternative guidelines and evaluated the interview data. The data of the 12 managers is enough to create good answers to the second and third research questions. The collected data consists of how valuable the guidelines are, how valuable the framework is and the criteria why the guidelines and framework are valuable or not. This chapter describes the results for the second and third research question and also particularities which are not problem statement related.

4.1 Value per section and improvements

To be able to answer the second research question the value of the guidelines need to be determined as well as the possible improvements. These improvements resulted in alternative guidelines that had to be valued. The focus of the second research question was on getting these results for the four sections.

RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?

In total 105 guidelines were derived from literature. The first phase of the single embedded case study (step 2 in figure 13) focused on determining which of these guidelines were definitely not applicable for Marel or which guidelines could be combined. This resulted in a list that contained 73 guidelines which needed to be valued in the second phase. In the second phase also improvements were suggested. In the third phase the improvements were rated and the interview data was validated. Via the Fleiss' kappa the inter-rater reliability of the interview data was calculated per section. The orange blocks in figure 13 show which results were derived per research step to be able to answer research question two.

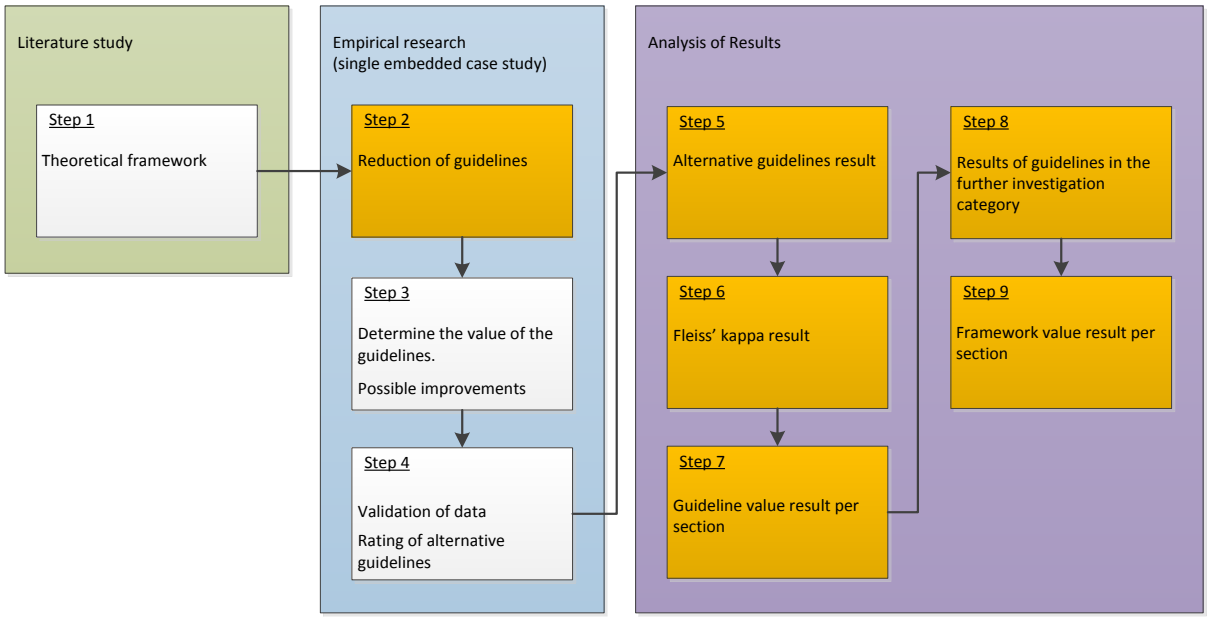


Figure 13: Derived results per research step to answer research question two

4.1.1 Reduction of guidelines

Within the first phase of the single embedded case study, the 105 guidelines from literature were analyzed and divided into the categories; 'valuable', 'combine' and 'remove'. Some guidelines were valuable, but had to be moved to another topic. Other guidelines had to be combined as they were a lot alike. For example the topic skills originally had 14 guidelines, of which one was removed. The result is 14 as two guidelines moved from the topic EA governance to skills and one guideline from topic skills to planning (14-1+2-1). Table 10 provides an overview of the guidelines for each category and the end result of this first phase.

Table 10 Reducing of guidelines

Topics	**Valuable**	**Combine**	**Remove**	**Result**
EA Governance	6	8	7	6
Communication	15	5	0	17
Commitment	6	6	0	10
Planning	7	10	3	13
Methodology	1	2	0	2
Development and maintenance of architecture models	11	0	4	11
Skills	13	0	1	14
Total	**59**	**31**	**15**	**73**

4.1.2 Alternative guidelines

During the interviews many managers mentioned improvements for the guidelines that were derived from literature. Some improvements were very obvious and some not. The obvious ones were adjusted by the researcher. The other improvements were very different from each other and had to be rated by the managers. In total 8 guidelines had to be rated, which was done by 7 of the in total 12 managers. These 7 managers consisted of one business executive manager, three business middle managers, one IT executive manager and two IT middle managers. One business middle manager didn't rate guideline number 49 and one IT middle manager didn't rate guideline number 9. Table 11, shows per guideline the average rates per section and the sum of these average rates per guideline. Within this analysis is chosen for an average of the rates per section so that each section has the same share in the result. A full overview of the ratings per manager, per guideline and per section and the approved guideline can be found in appendix U.

Table 11 Rating of alternative guidelines

Guideline number	Type of guideline	Business executive management	Business middle management	IT executive management	IT middle management	Total
No. 9	Original	2	1	2	2	7
	Alternative 1	1	2	1	1	5
No. 20	Original	1	2	2	2	7
	Alternative 1	2	3	3	2	10
	Alternative 2	3	1	1	2	7
No. 23	Original	2	1,3	3	2,5	8,8
	Alternative 1	4	2	2	1,5	9.5
	Alternative 2	3	3	1	2	9
	Alternative 3	1	3,7	4	4	12,7
No. 32	Original	1	1,3	2	2	6,3
	Alternative 1	2	1,7	1	1	5,7
No. 35	Original	2	1	2	2,5	7,5
	Alternative 1	1	2,7	1	1,5	6,2
	Alternative 2	3	2,3	3	2	10,3
No. 39	Original	1	1,3	1	1,5	4,8
	Alternative 1	2	1,7	2	1,5	7,2
No. 49	Original	1	1	1	2	5
	Alternative 1	2	2	2	1	7
No. 70	Original	1	1	1	1,5	4,5
	Alternative 1	2	2	2	1,5	7,5

4.1.3 Fleiss' kappa coefficient per section

The Fleiss' kappa coefficient is used to calculate the inter-rater reliability and determines how much the managers agree with each other in relation to what would be expected by chance. When the coefficient is equal to 1 than there is a perfect agreement. If the coefficient is < 0 then there is a poor agreement. As shown by table 12 most of the kappa values are close to zero or even below zero. Therefore according to this coefficient there is a poor agreement between the managers per section. However most of the managers agree that the guidelines are valuable, so a much higher coefficient was expected. This is because the Fleiss' kappa takes into consideration the chance that a manager rates the same when they would make their rating completely randomly. Due to the fact that the manager can only choose out of two values, true or not true, the chance that they randomly choose the same value is very big. Therefore the values are so low. Still it is possible to see differences between the sections. As table 12 shows, the coefficient for business executive management is higher than the other three. This is because they were in a full agreement about 64 guidelines that they were valuable. Within the section business middle management this was 61. However within the section IT executive management they agreed upon 68 guidelines and this section has a negative coefficient. This is because this section only has two managers instead of three. Therefore the chance that they rate the same is bigger and the coefficient is lower. This means that only sections can be compared in case they have the same amount of managers, which is in this research only business executive management and business middle management.

Table 12 Fleiss' kappa coefficient per section

Section	**Kappa coefficient**
Business executive management	0,119
Business middle management	0,009
IT executive management	-0,035
IT middle management	0,011

4.1.4 Value of the guidelines per section

To be able to compare the value of the guidelines per section, the average value of each guideline need to be calculated per section. Also the value of the guidelines within each topic is calculated to determine if there are topics that are not relevant according to a certain section. The sections are:

- *Business executive management*
- *Business middle management*
- *IT executive management*
- *IT middle management*

The ratings are divided in three categories, which are; 'valuable', 'further investigation needed' and 'not valuable'. Table 13 shows the amount of guidelines within the categories. The green column in table 13 represents the category 'valuable'. This column contains the guidelines of which the average percentage valuable is equal or above 75%. The orange column represents the category 'further investigation needed', which means that the average percentage valuable is between 75% and 25%. The red column represents the category 'not valuable' and means that the average percentage valuable is equal or below 25%. As shown in table 13 most of the guidelines are considered to be valuable and only a few guidelines need further investigation. There are no guidelines that are not valuable according to a section.

Table 13 Evaluation of valuable guidelines per section

Topics	Business executive management		Business middle management		IT executive management		IT middle management	
EA Governance	6	0	6	0	6	0	6	0
Communication	14	3	15	2	14	3	17	0
Commitment	8	2	7	3	10	0	10	0
Planning	11	2	13	0	12	1	11	2
Methodology	1	1	2	0	2	0	2	0
Development and maintenance of architecture models	10	1	9	2	11	0	9	2
Skills	13	1	8	6	13	1	12	2
Total	**63**	**10**	**60**	**13**	**68**	**5**	**67**	**6**
Legend	**>/= 75%**					**75% >< 25%**		

Also the topics need to be evaluated to check whether they are valuable. The percentage per topic is the average of all percentages of the guidelines within that topic. Appendix T provides an example of this calculation. As shown by figure 14, all percentages are above 75%, which means that all topics are relevant according to the managers in each section. Surprising is that the percentages of the IT middle managers are lower compared to the percentages of the IT executive managers, even though the amount of guidelines in the category 'valuable' is almost the same. The reason for this is that many guidelines had an average percentage of 75% due to the fact that there were four managers within this section and then they are categorized as valuable.

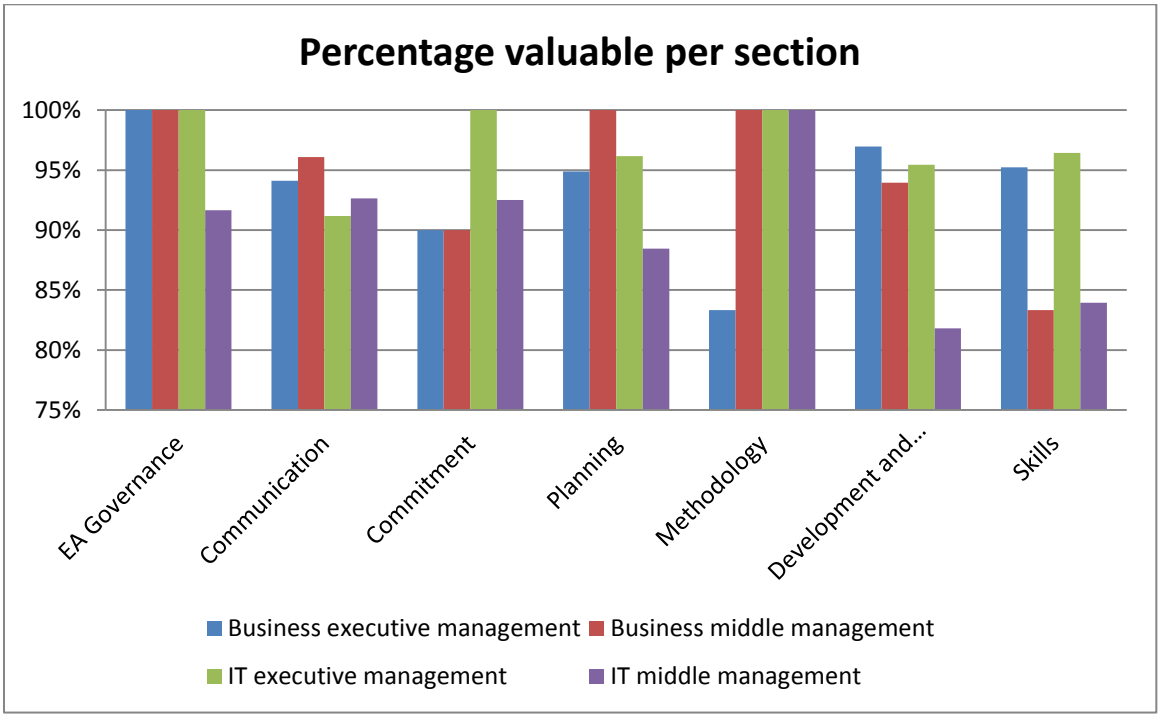


Figure 14: Percentage valuable; section business executive management

4.1.5 Guidelines that need further investigation

The guidelines within the category 'further investigation' need to be evaluated based on the given criteria. Table 14 provides an overview of the guidelines in this category and shows for which section it is valuable or needs further investigation. In case the guideline is valuable, then the cell is empty and if the guideline needs further investigation, the cell is orange. This table also shows if the guideline is valuable enough to use within Marel. The detailed explanation why a guideline is valuable for a certain section or not, can be found in appendix V.

Table 14 Guidelines that need further investigation

Guideline number	Criteria business executive management	Criteria business middle management	Criteria IT executive management	Criteria IT middle management	Valuable for Marel
No. 8					Yes
No. 9					Yes
No. 10					Yes
No. 12					Yes
No. 17					Yes
No. 20					Yes
No. 23					No
No. 29					Yes
No. 32					Yes
No. 33					Yes
No. 38					Yes
No. 40					Yes
No. 42					Yes
No. 45					Yes
No. 48					Yes
No. 51					Yes
No. 54					Yes
No. 55					Yes
No. 59					Yes
No. 60					Yes
No. 62					Yes
No. 64					Yes
No. 65					No
No. 66					Yes
No. 72					Yes
No. 73					Yes

4.1.6 Value of the framework per section

All managers rated the framework as valuable. Therefore the framework is also valuable for each section individually.

4.2 Value based on all data from all managers

The data necessary to answer the third research question consists of the results of this paragraph together with the results of research questions two. The focus of the third research question was on getting the result based on the data from all managers that contributed to this study.

RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?

This paragraph focusses on the value of the 73 guidelines that were derived from the single embedded case study. Via the Fleiss' kappa coefficient the inter-rater reliability is calculated for all managers and for the combination of sections. Also the reliability of the data is calculated via the Cronbach's α. The average value of each guideline was determined for all managers, which resulted in 72 valid guidelines according to this analysis. The orange blocks in figure 15 show which results were derived per research step to complement the previous results to be able to answer research question three.

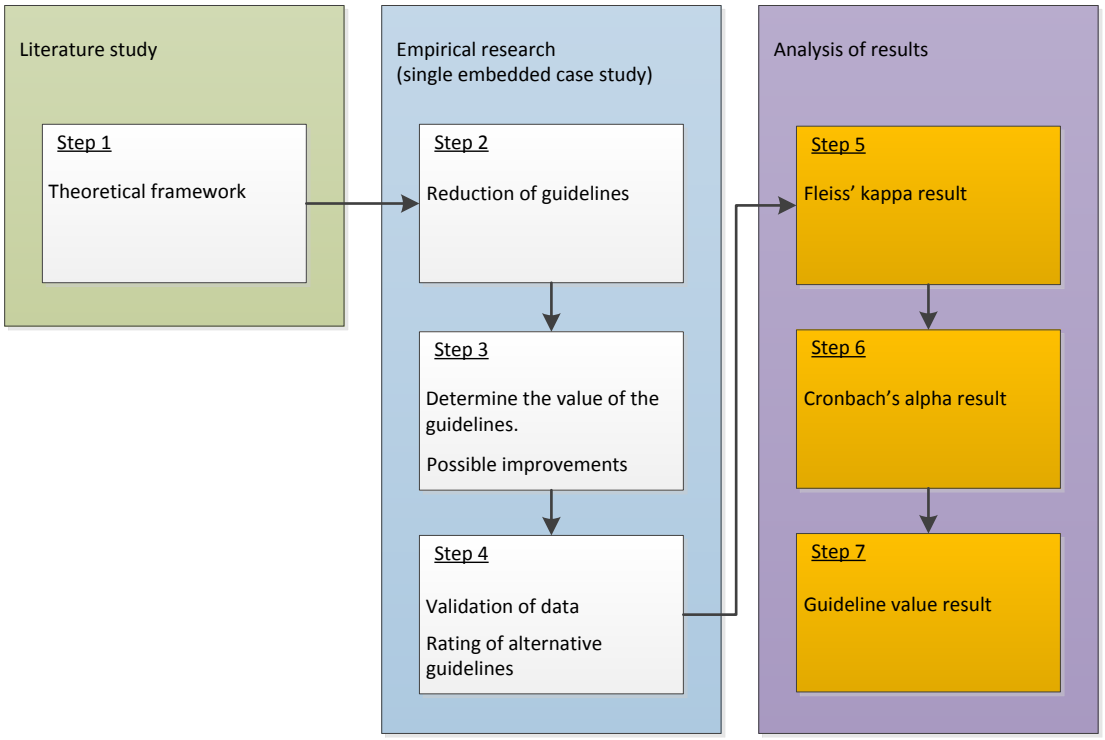


Figure 15: Derived results per research step to complement the results to answer research question three

4.2.1 Fleiss' kappa coefficient

The Fleiss' kappa coefficient is calculated for combinations of sections and for all sections together. As shown by table 15 all of the values are close to zero which means that according to this coefficient there is a poor agreement. The results show that business and IT executive management is more aligned than business and IT middle management. The results also show that only business and IT executive management have a higher kappa coefficient than the kappa coefficient for all sections.

Table 15 Fleiss' kappa coefficient for combinations of sections

Section	**Kappa coefficient**
Business executive and middle management	0,036
IT executive management and IT middle management	0,022
Business and IT executive management	0,075
Business and IT middle management	0,033
All sections	0,042

4.2.2 Cronbach's α

The Cronbach's α is used to estimate the reliability of the results regarding the value of all guidelines. The data set used to calculate this reliability coefficient consists of the value determination of all managers regarding all guidelines. The Cronbach's α for the 73 guidelines is 0,749, which is considered to be an acceptable value. This means that the internal consistency of the results regarding the value determination is acceptable.

4.2.3 Value of the guidelines for all sections

For research question three it is important to calculate the average value of a guideline for all managers. The ratings are divided into three categories, which are; 'valuable', 'further investigation needed' and 'not valuable'. These are the same categories as used in paragraph 4.1.4 and use the same corresponding percentages. All 12 managers have rated the 73 guidelines, which resulted in 72 valuable guidelines. Within the category 'further investigation needed' is only 1 guideline, which means that there are no guidelines that are considered to be not valuable. Based on the criteria provided by the managers, guideline number 65 is not valuable for Marel. These criteria can be found in appendix V. Table 16 provides an overview of the amount of guidelines within the categories.

Table 16 Evaluation of valuable guidelines for all sections

	Valuable	**Further investigation needed**
Topics	**>/= 75%**	**25% >< 75%**
EA Governance	6	0
Communication	17	0
Commitment	10	0
Planning	13	0
Methodology	2	0
Development and maintenance of architecture models	11	0
Skills	14	1
Total	**72**	**1**

Also the topics need to be evaluated if they are valuable for all managers. Figure 16 shows the average percentages of the topics, which clearly states that they are relevant according to the managers.

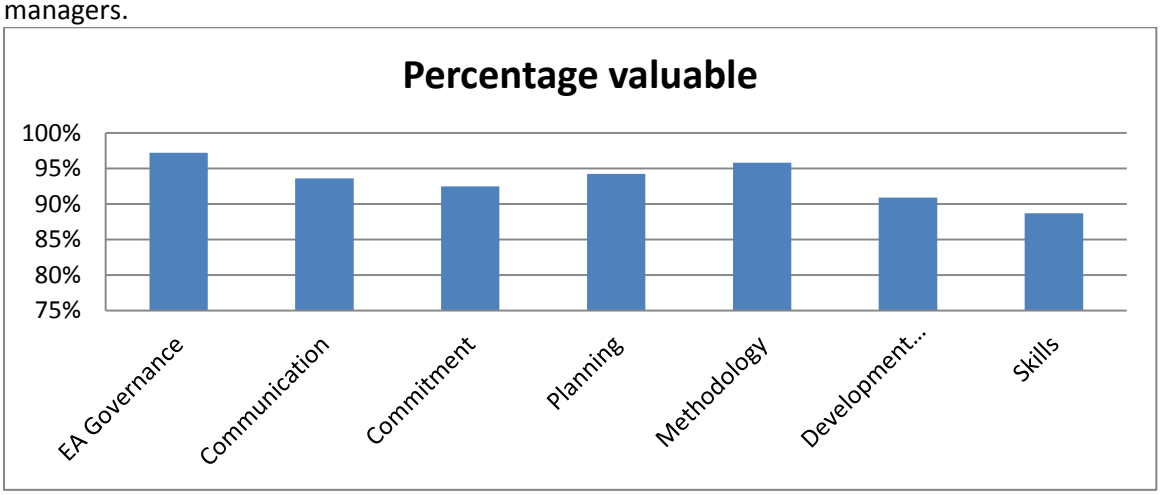


Figure 16: Percentage valuable; all managers

4.3 Particularities, not problem statement related

During the interviews many managers provided general comments and mentioned that some guidelines could be seen as general ones instead of EAM specific guidelines. In total 6 different comments are placed. Some comments are made by multiple managers, for example “There are too many guidelines”. Also 7 managers mentioned that some guidelines are applicable for EAM, but also for other management functions within the company. From the 73 guidelines, 12 were mentioned to be general guidelines. The general comments and general guidelines can be found in appendix X.

5 Conclusions

Within Marel as within literature is stated that it is a challenge to improve the alignment between business and IT as well as between strategic and tactical level (Chan & Reich, 2007; Max Saunders et al., 2008; Schaap, 2012). Also there is still a lack of practice-based guidelines for managerial actions at the tactical level (Tarafdar & Qrunfleh, 2009). EAM is seen as a discipline to improve the alignment (Löhe & Legner, 2014; Matthes et al., 2008; Radeke, 2011; Simon et al., 2014; K. Winter et al., 2010). No clear EAM guidelines were found within the scientific literature, therefore this master thesis focused on delivering a first set of EAM guidelines to improve the alignment. This is achieved by accomplishing the following objective:

Develop and improve enterprise architecture management guidelines to manage the alignment between business and IT and between strategic and tactical level.

Within this chapter, first the conclusions of the research are presented, followed by the business and scientific contribution. Next the limitations and recommendations for further research are presented. This chapter ends with the reflection of the research.

5.1 Research questions and objective

In order to provide a solution for the problem description and to fulfill the main objective the main research questions need to be answered. The answers to these questions will be provided in this paragraph. The first research question was answered via the literature review.

RQ 1: Which EAM guidelines need to be developed to manage business and IT alignment and the alignment of strategic and tactical level, based on theoretical research?

To answer the first research question, an exhaustive study is conducted to find existing guidelines within the research area's EAM, business management and IT management. Guidelines were found for aligning strategic and tactical alignment within the research area business management, but no guidelines were found within the research area's EAM or IT management. However factors, critical success factors, processes, practices and tasks were found from which guidelines were extracted. This resulted in 105 guidelines divided over 7 different topics and an EAM guideline framework (figure 17). The framework contains a triangle which represents the business. The framework also shows the connections between business and IT as well as strategic and tactical level. In the middle the EAM guideline topics are shown with on the left side the soft topics and on the right side the hard topics, both supported by the skills topic. The numbering of the topics is based on the importance. This framework with the corresponding guidelines provides the answer to research question 1. The complete list of guidelines can be found in appendix L.

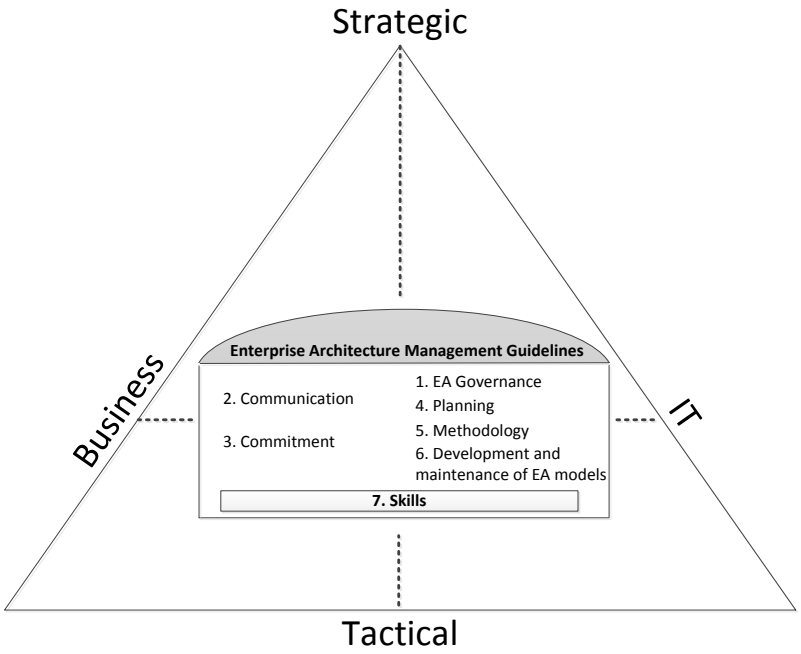


Figure 17: Framework for EAM guidelines

The results of the literature study needed to be empirically validated by determining the value of the guidelines and by addressing the possible improvements. This information was used to answer the second research question.

> *RQ 2: What is the value of the guidelines and how can they be improved according to the Marel sections; business management on strategic level, business management on tactical level, IT management on strategic level and IT management on tactical level?*

The 105 guidelines that were obtained from the literature study were too much to get them valued by all managers. Time wise it was not possible to get this arranged within the available time of the managers. Therefore via the first phase of the single embedded case study the amount of guidelines were reduced by three managers only. The amount of guidelines was reduced to 73 guidelines in total. During the interviews, which were the second phase of the single embedded case study, many managers mentioned improvements for the guidelines that were derived from literature. This resulted in 8 guidelines that had to be rated. Guideline number 39 contained an alternative one that suggested splitting up the original one into two new guidelines. This means that the amount of guidelines is now 74 instead of 73.

Next the Fleiss' kappa coefficient per section was calculated to determine the inter-rater reliability. According to the values derived from this calculation, the inter-rater reliability is poor as the coefficient is for each section close to zero or below zero. The reason for this low value is that the Fleiss' kappa takes into consideration the chance that a manager rates the same when they would make their rating completely randomly, while semi structured interviews were conducted in which the managers were specifically asked to support their opinion with criteria why the guideline is valuable. Therefore the chance that they rate completely randomly will be very low, which means that this coefficient cannot be used to determine the inter-rater reliability per section.

To be able to answer research question two, the value of the guidelines per section needed to be calculated. Within each section most of the guidelines were valuable and only a few needed further investigation. In total no guidelines were directly considered to be not valuable. However from the

guidelines that needed further investigation, number 23 and 65 were considered not to be valuable based on the criteria given by the managers. Many managers mentioned that guideline 23 was too vague to be used and the correct culture for implementation is missing. Guideline 65 was also not valuable enough because a KPI is not a target on its own and not valuable for Marel. Some other guidelines are valuable, but can be interpreted in many ways. These need to be adjusted in future research. Also some guidelines are more important for a certain section. For example number 29 and 32 are more important according to IT managers and number 59 and 73 are more important according to executive managers. From the 73 guidelines that were derived from phase 1 of the single embedded case study, two were not valuable enough. This resulted in 71 valuable guidelines. The average value of all guidelines in a certain topic for each section was above 75%. This means that all sections are valuable to use according to the managers. As figure 18 shows, both analyses together results in 72 valuable guidelines that form the result for research question two.

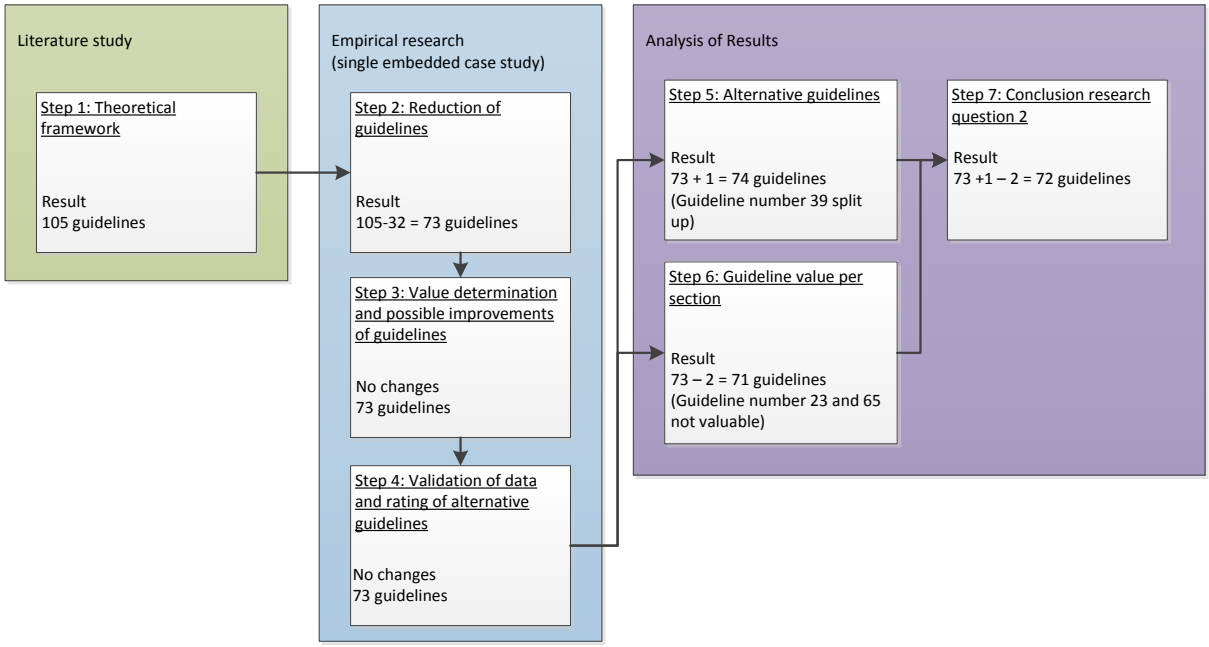


Figure 18: Amount of guidelines per step to answer research question 2

Also for research question three, the results from the first phase of the single embedded case study were used. This means that the 73 guideline were used for further analysis.

> *RQ 3: Which EAM guidelines will form the first set of EAM guidelines to manage the alignment between business and IT and between strategic and tactical level, based on the empirical validation?*

The Fleiss' kappa coefficient was calculated for combinations of sections and for all sections together. The results of these calculations were all close to zero, which was expected based on the previous Fleiss' kappa calculation. Therefore the same reasons count here as mentioned before and this coefficient cannot be used to determine the inter-rater reliability. The Cronbach's α in contrary shows that the answers were acceptable as the Cronbach's α is 0,749 for the 73 guidelines. This means that the internal consistency of the answers is acceptable.

Also the value of the guidelines for all sections was calculated. In total 72 of the 73 guidelines were valuable and only one needed further investigation. The one that needed further investigation was guideline 65 which was also in the same category within the analysis for the second research question. Based on the criteria this guideline is considered not to be valuable, which means that only

72 guidelines are valuable. The average value of all guidelines in a certain topic for all sections was above 75%, which means that all sections are valuable to use according to the managers. Additionally some of the managers mentioned that this list contains general guidelines that are applicable for EAM, but also for other management functions within the company. In total 12 general guidelines were addressed.

By combining these results together with the results of the second research question, the final result is 72 valuable guidelines (figure 19). Appendix Y contains the first set of EAM guidelines and provides an answer to research question three, which means that the objective of this research is accomplished.

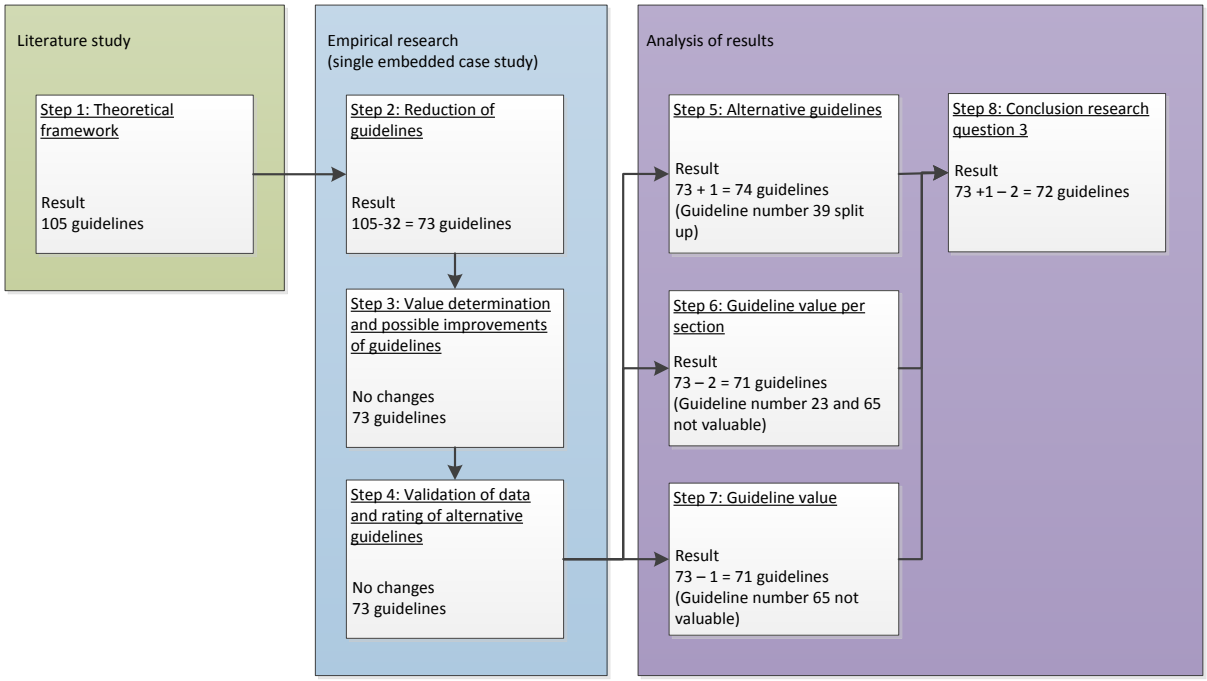


Figure 19: Amount of guidelines per step to answer research question 3

5.2 Contribution

It is remarkable that only a few guidelines were not valuable and that most of the managers are very aligned, even cross section. Therefore these guidelines can be used within Marel to improve the alignment between strategic and tactical level as well as between business and IT. It will provide guidelines to improve communication for example. As stated in literature a communication issue is that there often is a lack of a common language (Chan & Reich, 2007). A guideline that supports this common language is for example guideline number 8. Therefore these guidelines aren't only of value for Marel, but also for the scientific community.

Even though the managers mentioned that most of the guidelines are valuable, some of them also stated that there are too many guidelines to start with. A few managers mentioned that each topic should have a maximum of six guidelines to start with. When these are well executed, the list can be expanded. This will improve the chance that the guidelines will be successfully executed.

5.3 Limitations and recommendations for further research

The first set of guidelines is a set that is approved according to Marel managers. However it does not mean that the other guidelines derived from literature are not valuable at all. These guidelines could well be valuable at other companies that are structured differently, or are more used to a directive management approach instead of a participative one, for example. Therefore further research is recommended in this direction by finding an answer to the question:
W*hich EAM guidelines will be important for companies that have a directive approach?*

These guidelines should also be valued by many enterprise architects as this study mainly consisted of business and IT managers and only one enterprise architect. The managers can be seen as stakeholders for the enterprise architects and therefore it is important to know also how the architects value the guidelines. These results can be compared to determine the amount of coherency between the suppliers (enterprise architects) and internal customers (stakeholders/managers). Then the following question needs to be answered:
How much will stakeholders be aligned with enterprise architects about the value of the EAM guidelines?

Also practically it is difficult to use these guidelines. Some of these guidelines are a pre-condition for other guidelines. Therefore a maturity model would be a good next step to investigate to make this framework more complete and better to use. This results in the following research question:
Will a maturity model improve the practical use of the EAM guidelines?

One manager stated: "*These guidelines don't have much added value. Many of these are general management guidelines and are not to be used within Marel. When there are too many guidelines, then there is no room for own initiative anymore."*. It can well be that these guidelines are not applicable for certain companies, which can be size or complexity depended for example. Therefore further research is advised in this direction. The corresponding research question can be:
What business criteria determine if the guidelines are valuable for a company or not?

As this is a first set that is only validated by 12 managers at one company, further research is recommended to conduct the same research at other companies within the industry sector to increase the external validity of this research.

5.4 Reflection

The goal of the reflection is to address the limitations of the product and the limitations of the process.

Product reflection
As expected, the external validity is low, due to the relatively small group of managers that valued and improved the guidelines. The reliability on the other hand was acceptable based on the Cronbach's α calculation. This was not expected. To increase the reliability, measures were taken to decrease the respondent bias. This was done by asking the managers to confirm if they agree with the analysis and if they don't agree, what had to be changed. Unfortunately only 7 of the 12 managers validated the analysis and the others didn't respond.
Also one of the goals was to choose two managers per location to be able to compare if the managers from the same location and section share the same opinion. Due to the fact that from the 14 managers only the data of 12 managers could be used, it was not possible to do the comparison per location.

Process reflection
Officially the research started in June 2014 as at that moment the course was registered. Due to some private issues the first concrete steps were taken in November 2014. This means that the total duration of this research is around 15 months, which is one month longer than originally planned. The amount of hours used for this research is by far more than the expected 700 hours. The amount of hours spend will be around 1200.

The subject was very big even though it was bigger in the beginning. However if the subject was made smaller, for example only focusing on business and IT alignment, the amount of hours spend could have been less or I would have gone in more depth. But already at the beginning I believed in this subject and found substantial information that this didn't exist within scientific literature. Therefore I wanted to go for the maximum result and did whatever I could to bring it to a good end.

Each phase of the research had his hurdles and sunny moments. For example the hurdle that was taken during the literature research was the uncertainty of finding valuable information. But when the writing started, pieces of the puzzle were falling together, which gave me more energy.

Even though sometimes it was difficult, the research provided new insights, believe and perseverance for me as a person. When reflecting this research I believe that this has a scientific contribution and that it can be used in daily practice.

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7 Appendices

7.1 Appendix A List of tables and figures

7.2 Appendix B Search method keywords

To be able to find the right articles, the following keywords were used per sub research question.

Keywords for sub research question 1 “Which guidelines can EAM provide?”

Research question:				
Keywords	Guidelines	EAM		
Different spellings		Aligning, Alignment		
Synonyms	Guidance, ground rule, best practice, code, rule, instruction, protocol, advice, KPI			
Alternative keywords	Critical success factors	Enterprise architecture management		

Keywords for sub research question 2 “Which guidelines are needed to align business and IT?”

Research question:				
Keywords	Guidelines	Align	Business	IT
Different spellings		Aligning, Alignment		
Synonyms	Guidance, ground rule, best practice, code, rule, instruction, protocol, advice, KPI		Organization, multinational, company, corporate	Information technology, Information management
Alternative keywords	Critical success factors	Implementation, transformation, transform		Enterprise architecture management, EAM

Keywords for sub research question 3 “Which guidelines are needed to align strategic and tactical level?”

Research question:				
Keywords	Guidelines	Align	Strategic	Tactical
Different spellings		Aligning, Alignment		
Synonyms	Guidance, ground rule, best practice, code, rule, instruction, protocol, advice, KPI		Strategic management	Tactical management
Alternative keywords	Critical success factors	Implementation, transformation, transform	Executive management	Middle management

7.3 Appendix C Relevant references

Scientific references used for the problem statement and for answering the research questions.

Author	Title	Year
Aier, S., Gleichauf, B., & Winter, R.	Understanding Enterprise Architecture Management Design-An Empirical Analysis.	2011
Chan, Y. E.	Why haven't we mastered alignment? The importance of the informal organization structure.	2002
Chan, Y. E., & Reich, B. H.	IT alignment: what have we learned?	2007
Charoensuk, S., Wongsurawat, W., & Khang, D. B.	Business-IT Alignment: A practical research approach.	2014
Cocks, G.	Emerging concepts for implementing strategy.	2010
Farrell, I. J.	Aligning IT to Corporate Objectives: Organisational factors in use.	2003
Floyd, S. W., & Wooldridge, B.	Dinosaurs or dynamos? Recognizing middle management's strategic role.	1994
Henderson, J. C., & Venkatraman, N.	Strategic alignment: Leveraging information technology for transforming organizations.	1993
Hrebiniak, L. G.	Obstacles to effective strategy implementation.	2006
Huang, S.-J., Wu, M.-S., & Chen, L.-W.	Critical success factors in aligning IT and business objectives: A Delphi study.	2013
Kotter, J. P.	Leading change: Why transformation efforts fail.	1995
Löhe, J., & Legner, C.	Overcoming implementation challenges in enterprise architecture management: a design theory for architecture-driven IT Management (ADRIMA).	2014
Luftman, J., & Brier, T.	Achieving and sustaining business-IT alignment.	1999
Luftman, J., Papp, R., & Brier, T.	Enablers and inhibitors of business-IT alignment.	1999
Matthes, F., Buckl, S., Leitel, J., & Schweda, C. M.	Enterprise architecture management tool survey 2008.	2008
Nikpay, F., Selamat, H., Rouhani, B. D., & Nikfard, P.	A Review of Critical Success Factors of Enterprise Architecture Implementation.	2013
Open Group	TOGAF Version 9	2009
Radeke, F.	Toward understanding enterprise architecture management's role in strategic change: antecedents, processes, outcomes.	2011
Reich, B. H., & Benbasat, I.	Factors that influence the social dimension of alignment between business and information technology objectives.	2000
Salih, A., & Doll, Y.	A middle management perspective on strategy implementation.	2013
Saunders, M., Mann, R., & Smith, R.	Implementing Strategic initiatives: A framework of leading practices.	2008
Schaap, J. I.	Strategy Implementations-Can Organizations Attain Outstanding Performance?	2012
Schmidt, C., & Buxmann, P.	Outcomes and success factors of enterprise IT architecture management: empirical insight from the international financial services industry.	2011

Seppanen, V., Heikkila, J., & Liimatainen, K.	Key issues in EA-implementation: case study of two Finnish government agencies.	2009
Simon, D., Fischbach, K., & Schoder, D.	Enterprise architecture management and its role in corporate strategic management.	2014
Steenbergen, M. v.	Maturity and effectiveness of enterprise architecture.	2011
Tarafdar, M., & Qrunfleh, S.	Examining tactical IT-business alignment.	2010
Winter, K., Buckl, S., Matthes, F., & Schweda, C. M.	Investigating the State-of-the-Art in Enterprise Architecture Management Methods in literature and Practice.	2010
Winter, R., Legner, C., & Fischbach, K.	Introduction to the special issue on enterprise architecture management.	2014
Ylimäki, T.	Potential critical success factors for enterprise architecture.	2008

References used per research question

Sub research question	Amount of references	Publication year range
SRQ 1: Which guidelines can EAM provide?	12	2008 – 2014
SRQ 2: Which guidelines are needed to align business and IT?	9	1999 – 2014
SRQ 3: Which guidelines are needed to align strategic and tactical level?	8	1994 – 2013

7.4 Appendix D Definitions explanation

Definition of EAM

Within the literature several different definitions are given for EAM. Unfortunately no general accepted definition is available. Simon et al. mention that "EA management captures all those processes, methods, tools and responsibilities needed to build a holistic and integrated view of the enterprise and allow for continually aligned steering of business and IT (Simon et al., 2014). The definition used by Winter et al. for EAM is "a continuous, iterative (and self-maintaining) process seeking to improve the alignment of business and IT in an (virtual) enterprise. Based on a holistic perspective on the enterprise furnished with information from other enterprise level management processes it provides input to, exerts control over, and defines guidelines for other enterprise level management functions" (K. Winter et al., 2010). According to Matthes EAM is "a continuous and iterative process controlling and improving the existing and planned IT support for an organization. The process not only considers the information technology (IT) of the enterprise, also business processes, business goals, strategies etc. are considered in order to build a holistic and integrated view on the enterprise (Matthes et al., 2008). Löhe and Legner provides a different definition which is that "EAM is a management and design function targeting the enterprise in a comprehensive manner" (Löhe & Legner, 2014). This one is too generic and doesn't capture the details as the previous three definitions. Another definition is provided by Seppanen et al., which is "enterprise architecting is the set of processes, methods, tools, and structures necessary to implement an enterprise-wide coherent and consistent IT architecture for supporting the operations" (Seppanen et al., 2009). Compared to the first four definitions in this paragraph this definition limits itself to IT architecture and is therefore not suitable for this research.

Due to the focus on business IT alignment and guidelines for other enterprise management functions the definition of Winter et al. is the most appropriate one for this research. Their definition is:

"EAM is a continuous, iterative (and self-maintaining) process seeking to improve the alignment of business and IT in an (virtual) enterprise. Based on a holistic perspective on the enterprise furnished with information from other enterprise level management processes it provides input to, exerts control over, and defines guidelines for other enterprise level management functions." (K. Winter et al., 2010)

Definition of business and IT alignment

Many authors have written about business and IT alignment. One of the definitions that is used often according to Luftman, Papp and Brier for business and IT alignment is "applying information technology (IT) in an appropriate and timely way, in harmony with business strategies, goals and needs" (Luftman et al., 1999). Reich and Benbasat defined alignment as "the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives, and plans (Reich & Benbasat, 2000). The definition used by Chan is about business and IT alignment on strategic level, which is "Strategic alignment means the fit between the priorities and activities of the IS function and the business unit. The goal in strategic alignment is for IS priorities, capabilities, decisions, and actions to support those of the entire business" (Chan, 2002). Chan means with IS, Information Systems. Tarafdar and Qrunfleh have two statements for business and IT alignment. The first one is for the strategic level, which is "existence of IT-business alignment at the strategic level implies that there is a match between the business strategy and the overall scope and portfolio of IT. Its associated processes are about planning for and choosing applications and systems that are appropriate to the firm's strategic goals and objectives." (Tarafdar & Qrunfleh, 2010). The second one is for the tactical level, which is "IT-business alignment at the tactical level is accomplished when planned applications are implemented and business benefits from them are

realized. Processes for tactical alignment should facilitate operational level linkages between IT and the functions vis-à-vis application implementation projects, technology choices, resource allocations, and skill requirements, and synchronization of management, delivery and governance strategies between IT and business." (Tarafdar & Qrunfleh, 2010).

Because the definition of Luftman, Papp and Brier is used by many authors it will be the basis for the definition for this research, complemented with a part of the tactical level statement of Tarafdar and Qrunfleh as it also reflects the scope of this research. Therefore the definition to be used for business and IT alignment will be:

"Applying information technology (IT) in an appropriate and timely way, in harmony with business strategies, goals and needs, via processes that facilitate operational level linkages between IT and the functions vis-à-vis application implementation projects, technology choices, resource allocations, and skill requirements, and synchronization of management, delivery and governance strategies between IT and business."

7.5 Appendix E Business and IT alignment topics

Topic	Author Total	Charoensuk 2014	Tarafdar & Qrunfleh 2010 tactical	Tarafdar & Qrunfleh 2009 Strategic	Tarafdar & Qrunfleh 2009 Tactical	Farrell (2003)	Chan & Reich (2007) strategic	Luftman (1999) strategic	Luftman (1999) strategic	Huang. Wu & Chen (2013)	Chan (2002) strategic
Shared domain knowledge	1	1									
Communication	5	1	1		1					1	1
Planning sophistication	1	1									
IT success	1	1									
It management sophistication	2	1						1			
Governance	2		1						1		
Skill	4		1		1				1		1
Sourcing related	1		1								
IT professionals role related	1		1								
Project related	4		1		1			1		1	
Planning	4			1		1				1	1
Opportunities	1			1							
Influence of the CIO in strategic planning	2			1				1			
Decision making processes	1				1						
Technology standardization firm wide	1				1						
Commitment	4						1	1		1	1
Common language	1						1				
Collaboration	1						1				
Top management's knowledge of IT	1						1				
IT management's knowledge of the business	2						1	1			
Business goals and objectives that are known to IT management	1						1				
The corporate business plan being available to IT management	2						1				1
The IT department being able to identify creative ways to use IT strategically	1						1				
IT staff who are able to keep up with advances in IT	1						1				
Frequent communication between end users and IT departments	1						1				

Topic	Author Total	Charoensuk 2014	Tarafdar & Qrunfleh 2010 tactical	Tarafdar & Qrunfleh 2009 Strategic	Tarafdar & Qrunfleh 2009 Tactical	Farrell (2003)	Chan & Reich (2007) strategic	Luftman (1999) strategic	Luftman (1999) strategic	Huang. Wu & Chen (2013)	Chan (2002) strategic
Business and IT management partnering to prioritize applications development	2						1	1			
The IT department's efficiency and reliability	1						1				
An IT department that is responsive to user needs	1						1				
Business scope	1								1		
Distinctive competencies	1								1		
Administrative structure	1								1		
processes	2								1	1	
Technology scope	1								1		
Systemic competencies	1								1		
Architecture	1								1		
Senior management able to enforce performance management thoroughly	1									1	
Decentralized reporting relationships and committees	1										1
Informal networks and relationships	1										1
Career paths and cross-functional linkages	1										1
Incentives and rewards	1										1
Performance measurement and evaluation	1										1

7.6 Appendix F Extracted guidelines regarding business and IT alignment

Topic	Guideline	Author
Communication	"Interaction between the IT function and other functions."	(Tarafdar & Qrunfleh, 2010)
	"Institute formal IT-business communication through regular meetings of steering and project committees, desktop icons on user screens for IT support requests, corporate portals and newsletters, and IT point-person within functions."	(Tarafdar & Qrunfleh, 2010)
	"Informal and impromptu walk-arounds by IT managers."	(Tarafdar & Qrunfleh, 2009)
	"It is critical to create a culture that appreciates communication."	(Huang et al., 2013)
Planning	Business planning must be linked to IT planning in a way that business plans are being supported by strategic IT plans. To enable this, the content of IT and business plans must be aligned and regular meetings and interaction among the CEO, CFO, COO and CIO must occur.	(Tarafdar & Qrunfleh, 2009)
Commitment	It is important that top management is committed to the strategic use of IT. The CIO must be proactive and the IT professionals need to be skilled in the softer side of business.	(Chan & Reich, 2007)
Skills	"Skills (relating to technology and culture) required other of IT professionals at the execution level change as the business strategy changes; retool skills and expertise of the IT function and keep them continually current."	(Tarafdar & Qrunfleh, 2010)
	Training/skill development opportunities must be available for IS personnel to become customer-oriented and business knowledgeable.	(Chan & Reich, 2007)
Projects	Stakeholders must understand the project context comprehensively and documentation and information must be provided to all key players during the implementation.	(Huang et al., 2013)
	Classify projects in order of business importance. (category "project prioritization")	(Tarafdar & Qrunfleh, 2010)
	Evaluate IT managers based on how well they fulfill objectives of the broader IT strategic plan. (category "project prioritization")	(Tarafdar & Qrunfleh, 2010)
	Keep part of the IT budget unallocated to any specific project; use it for projects which emerge over the course of the year. (category "project	(Tarafdar & Qrunfleh, 2010)

	prioritization")	
	Avoid over-formalizing project-portfolio management and prioritization. (category "project prioritization")	(Tarafdar & Qrunfleh, 2010)
	Articulate business metrics (cycle time reduction, cost savings etc.) and technical metrics (on time, within budget) for project success Measure and monitor business success criteria, post project-execution. (category "Matching of technical deliverables and business deliverables")	(Tarafdar & Qrunfleh, 2010)
	Measure and monitor business success criteria, post project-execution. (category "Matching of technical deliverables and business deliverables")	(Tarafdar & Qrunfleh, 2010)
	Create multiple approval authorities, depending on project size and budget. (category "dynamic resource allocation")	(Tarafdar & Qrunfleh, 2010)
	Acquire and release temporary resources for projects. (category "dynamic resource allocation")	(Tarafdar & Qrunfleh, 2010)
	Functional project team members should take care of process and workflow requirements, IT members should address development, configuration and customization. (category "mixed project team composition")	(Tarafdar & Qrunfleh, 2010)
	Functional project team leads should coordinate user requirements and change requests, technical leads should match these with capabilities of the technology. (category "mixed project team composition")	(Tarafdar & Qrunfleh, 2010)
	Appoint functional project sponsors. (category "project sponsorship")	(Tarafdar & Qrunfleh, 2010)
	Institute software-based and governance- based processes for project monitoring. (category "project monitoring")	(Tarafdar & Qrunfleh, 2010)

7.7 Appendix G Strategic and tactical alignment topics

Topic	Author Total	Salih & Doll 2013	Tarafdar & Qrunfleh 2010	Floyd & Wooldridge 1994	Cocks 2010	Schaap 2012	Saunders, Mann & Smith 2008
Communication	5	1	1		1	1	1
Middle management must articulating tactics and allocating budgets that are necessary for achieving a strategy	1			**1**			
Middle management must monitoring the performance of individuals and groups who are tasked with strategy implementation	2			1			1
Middle management must taking corrective measures when behaviour falls below expectation	1			1			
Middle management must be included in formulating strategic initiatives	1	1					
Commitment	3	1		1			1
Focused leadership of the right people	2				1	**1**	
Project management	2				1		1
Allocate the best people with the right skills to the right jobs	2				1		1
Skills	3				1	**1**	1
Creating a company culture that enables successful strategy implementation	2					1	1
Developing budgets that steer ample resources into those activities critical to strategic success	1					1	
Ensuring that policies and operating procedures facilitate rather than impede effective execution	1					1	
Using the best-known practices to perform core business activities and pushing for continuous improvement.	1					1	
Installing information and operating systems that enable company personnel to better carry out their strategic roles day in and day out	2					1	1
Tying rewards and incentives directly to the achievement of performance objectives and good strategy execution	1					1	
Planning	1						1
Aligning implementation	1						1
Learning	1						1
Creating the infrastructure for deployment	1						1
Understanding the business drivers	1						1
Identifying deployment options	1						1

7.8 Appendix H Extracted guidelines regarding strategic and tactical alignment

Topic	Guideline	Author
Communication	Good communication avoids misinformation or lack of information impeding deployment.	(Max Saunders et al., 2008)
	Two-way communication with all employees helps understanding of the initiative.	(Max Saunders et al., 2008)
	Small group briefings facilitate feedback and clarification.	(Max Saunders et al., 2008)
	Document and communicate expectations.	(Max Saunders et al., 2008)
	Ensure good communication of the business drivers.	(Max Saunders et al., 2008)
	Middle managers play a key role in communicating strategies and for ensuring a shared understanding of the strategy.	(Max Saunders et al., 2008)
	Informal communication can be more important than formal communication of strategy.	(Max Saunders et al., 2008)
	Conduct retreats, staff meetings, project meetings, round tables, and post strategic plan documents on company portals.	(Tarafdar & Qrunfleh, 2010)
	Communication channels must be highly visible in the workplace, for example scorecards, dashboard and flowcharts.	(Cocks, 2010)
Buy-in	A consultative approach through participation increases ownership and commitment.	(Max Saunders et al., 2008)
	Consultation with key stakeholders, including employees, at the planning and implementation phases increases buy-in.	(Max Saunders et al., 2008)
	Cultural and organizational elements underpin success in implementation. An initiative that matches the culture and competencies of an organization can ensure a rapid and successful implementation.	(Max Saunders et al., 2008)
	Senior management demonstrating their commitment to the initiative increases buy-in.	(Max Saunders et al., 2008)
	Using a formal process such as action planning to convert strategic objectives into action plans helps understanding and buy-in.	(Max Saunders et al., 2008)
	Linking strategy to departmental and operational goals helps buy-in and alignment.	(Max Saunders et al., 2008)
	The application of many HR policies, including compensation packages, incentives, employee relations and training, are associated with how employees relate to the strategic direction of an organization, and so can facilitate buy-in.	(Max Saunders et al., 2008)
	Middle managers need to be involved in the formulation of strategic initiatives. Due to the contribution in the strategic efforts they will develop a sense of ownership.	(Salih & Doll, 2013)
	Creating a company culture that enables successful strategy implementation.	(Schaap, 2012)

Alignment	A set of organization values that govern decisions helps ensure alignment. Strategic decisions remain consistent with these values, while retaining scope for autonomous action as initiatives are deployed.	(Max Saunders et al., 2008)
	Action planning workshops across all levels helps align the interpretation of the strategy. The action planning process and the dialogue it promotes helps align the everyday decision making in units or departments with the strategic direction.	(Max Saunders et al., 2008)
	Link project plans to formally documented aims for the initiative (that is, identify how individual projects align with the strategy).	(Max Saunders et al., 2008)
	Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture. In top-down cultures changing behavior and routines through task alignment is more effective than using logic and persuasion.	(Max Saunders et al., 2008)
	Linking strategic and operational change is important for developing detailed action plans, key tasks and control processes. It is also important in communicating the initiative in a task-oriented manner throughout the organization.	(Max Saunders et al., 2008)
	Allocating resources to the new initiative through the budget aligns behaviour with the strategy.	(Max Saunders et al., 2008)
	Developing a suggestion process can assist alignment, especially for those not in the leading group. An anonymous process for suggestions and feedback is effective.	(Max Saunders et al., 2008)
	Aligning compensation and recognition systems with the strategy helps ensure that behaviors support the strategic objectives.	(Max Saunders et al., 2008)
	Breaking the strategic plan into required activities and defined tasks.	(Cocks, 2010)
	Put resources against the activities and tasks.	(Cocks, 2010)
	Monitor the performance of the activities and tasks.	(Cocks, 2010)
Learning	A robust system of performance measurement is needed to evaluate the progress of the deployment of a strategic initiative and to identify opportunities for improvement.	(Max Saunders et al., 2008)
	Performance measurements can range from a large number of metrics to a single KPI. There should be regular review of progress by monitoring the appropriate measures.	(Max Saunders et al., 2008)
	The choice of KPIs determines the activities management will focus on during deployment, and therefore the learning that will take place.	(Max Saunders et al., 2008)
	Planned strategy and emergent (unplanned) strategy typically evolve hand-in-hand and interact as strategic initiatives are implemented. This should allow the experience gained during deployment to shape ongoing strategy.	(Max Saunders et al., 2008)
	Strategic initiatives should be continually evaluated and adapted as events unfold during the process of deployment. Be sensitive to external environmental signals, and continuously adapt to changes in the environment.	(Max Saunders et al., 2008)
	There should be regular evaluation of the progress of strategy implementation by the	(Max Saunders et al., 2008)

	board of directors.	
	The board should also ensure that a steady flow of initiatives and projects is established in order to achieve the strategic objectives.	(Max Saunders et al., 2008)
	A continuous improvement philosophy and the core CPE values of organizational and personal learning facilitate learning at all levels.	(Max Saunders et al., 2008)
	Middle management must monitor the performance of individuals and groups who are tasked with strategy implementation.	(Floyd & Wooldridge, 1994)
Creating the infrastructure	The form of the deployment infrastructure is context specific, so a single change agent or "champion" may be appropriate in some circumstances, and a team approach in others.	(Max Saunders et al., 2008)
	Clearly identify the roles of those involved, for example, the champion, mentor/sponsor, team member.	(Max Saunders et al., 2008)
	Aim for champions at several levels in the organization.	(Max Saunders et al., 2008)
	A consultative approach to deployment often entails setting up project teams or task forces. Teams may be cross-functional or within business units.	(Max Saunders et al., 2008)
	Teams are usually responsible for identifying drivers for the objectives and developing action plans.	(Max Saunders et al., 2008)
	An alternative is the intervention approach, where co-ordination and authority remain with the change agent, but aspects of deployment are delegated. Teams may be set up that have responsibility for partial implementation of solutions. The change sponsor monitors progress and may intervene to ensure changes are implemented.	(Max Saunders et al., 2008)
	A participative approach to deployment (such as project teams) is most appropriate for incremental change in organizations.	(Max Saunders et al., 2008)
	Directive approaches are more common when transformational change is required.	(Max Saunders et al., 2008)
	To allocate the best people with the right skills to the right job.	(Cocks, 2010)
	Staffing the organization with the needed skills and expertise, consciously building and strengthening strategy-supportive competencies and competitive capabilities, and organizing the work effort.	(Schaap, 2012)
Understanding the business drivers	The business drivers are the main business reasons for deploying a strategic initiative.	(Max Saunders et al., 2008)
	A systematic process (research phase) should be used to identify drivers for objectives.	(Max Saunders et al., 2008)
	The business drivers form the basis for developing action plans, and action plans should relate back to the business drivers.	(Max Saunders et al., 2008)
	An understanding of the drivers by implementers (typically middle managers) is important during the deployment phase. Ensuring good communication of the drivers can be achieved by, for example, workshops or by having an expert on the team.	(Max Saunders et al., 2008)

	Involving wider teams in the assessment of achievement against the drivers will facilitate understanding. Examples are KPI monitoring or regular reviews against objectives.	(Max Saunders et al., 2008)
	Most businesses have systems to improve customer and market focus, and are focusing on other drivers, for example, innovation, for future success.	(Max Saunders et al., 2008)
	A redirection of training and support will be required for any new business drivers identified.	(Max Saunders et al., 2008)
	Installing information and operating systems that enable company personnel to better carry out their strategic roles day in and day out.	(Schaap, 2012)
Deployment options	Identifying options during deployment is an important element of risk management in strategy implementation.	(Max Saunders et al., 2008)
	A decision process using business models and proven decision tools can be used to evaluate alternative courses of action. Formally considering alternatives minimizes risk. Identified risks should be prioritized, and then plans made to mitigate and manage them.	(Max Saunders et al., 2008)
	A set of organization values acts as a reference point when considering each option, and guides decision making.	(Max Saunders et al., 2008)
	It is during the action planning phase that many options and alternatives will be considered, including choosing the performance measures to be used to track progress.	(Max Saunders et al., 2008)
	In manufacturing firms, identifying options when implementing business strategies (for example, choice of products and prices) is important to gaining a cost advantage.	(Max Saunders et al., 2008)
	If the strategic initiative is to be deployed through a series of projects, then identifying which potential projects will proceed, and the scheduling of a flow of projects to ensure continuity is important.	(Max Saunders et al., 2008)

7.9 Appendix I EAM topics

Topic	Author Total	Löhe & Legner 2014	Seppanen, Heikkila, Liimatainen 2009	Aier, Gleichauf, Winter 2011	Ylimäki 2008	Steenbergen 2011	Schmidt & Buxmann 2011	Radeke 2011	Nikpay, Selamat, Rouhani, Nikfard 2013	Togaf 9 2009
Top management buy-in	2	1	1							
Implementation of an EA governance process	6	1	1		**1**		**1**		**1**	**1**
EAM's alignment with other enterprise life cycle processes	1	1								
Skills	3		1		1				1	
Insufficient support for the development of EA	2		1						1	
Strategic design of an architectural vision	2			1				1		
Development and maintenance of architecture models	4			1	**1**	**1**				**1**
Planning	5			1			1	1	1	1
Implementation of EA	2			1			**1**			
Analysis of EA on the basis of architecture models	1			1						
Commitment	3			1	1	1				
Governance	1			1						
Methodology	3			1	1	1				
EA models	1			1						
Project management	2			1	1					
Training and education	2			1		1				
Organizational culture	2			1	1					
IT investment strategy	2			1	1					
Assessment and evaluation	2			1	1					

Topic	Author Total	Löhe & Legner 2014	Seppanen, Heikkila, Liimatainen 2009	Aier, Gleichauf, Winter 2011	Ylimäki 2008	Steenbergen 2011	Schmidt & Buxmann 2011	Radeke 2011	Nikpay, Selamat, Rouhani, Nikfard 2013	Togaf 9 2009
Business-driven approach	2			1	1					
Communication	4			1	1		1		1	
Scope	2			1	1					
Use of architecture	1					1				
Alignment with business	1					1				
Alignment with the development process	1					1				
Alignment with operations	1					1				
Roles and responsibilities	1					1				
Coordination of developments	1					1				
Monitoring	2					1		1		
Quality management	1					1				
Maintenance of the architectural process	1					1				
Maintenance of the architectural deliverables	1					1				
Consultation	1					1				
Architectural tools	1					1				
Budgeting and planning	1					1				
EA documentation	2						1		1	
EA programming	2				1		1			
Stakeholder participation	2						1		1	
Management	1								1	
Architecture context iteration	1									1

7.10 Appendix J EAM extracted guidelines

Topic	Guideline	Author
EA governance	The conformance of change projects need to be ensured via formal review and approval processes.	(Schmidt & Buxmann, 2011)
	The formal review and approval processes need a governance structure that is positioned into the broader scope of IT and corporate governance.	(Löhe & Legner, 2014)
	The adoption of the governance structure must be started immediately when an organization decided to initiate the development of EA.	(Seppanen et al., 2009)
	To set up a governance structure the roles, responsibilities and authorizations must be defined, documented and arranged as well as the processes, activities and tasks.	(Ylimäki, 2008)
	change management practices for architectural and organizational changes and risk management for architectural risks must be defined, documented and arranged	(Ylimäki, 2008)
Communication	Communication must consist of a communication plan and strategy that need to be documented and used.	(Ylimäki, 2008)
	Also a common, well-defined vocabulary of concepts and terms must be defined, documented and used, which need to communicated through various channels at certain moments in time.	(Ylimäki, 2008)
	Stakeholders must be informed about all EA- related issues and success.	(Schmidt & Buxmann, 2011)
Commitment	To be able to get commitment for the EA function, architects need to have an extensive network within the company and results of EAM must be communicated with management functions.	(Aier, Gleichauf, & Winter, 2011; Ylimäki, 2008)
	The top management must be involved in the development of EA to get top management commitment.	(Ylimäki, 2008)
Planning	“Assessment of strategic business and IT options through architects.”	(Open_Group, 2009; Radeke, 2011)
	“Development of strategic architecture initiatives.”	(Open_Group, 2009; Radeke, 2011)
	“Update of target architecture.”	(Open_Group, 2009; Radeke, 2011)

	"Derivation of roadmaps."	(Open_Group, 2009; Radeke, 2011)
	"Assessment and prioritization of the project portfolio."	(Open_Group, 2009; Radeke, 2011)
Methodology	A methodology should be based on an existing architectural framework.	(Ylimäki, 2008)
	When a methodology is going to be chosen, the following aspects should be considered; "guidance for decision making and documentation", "support for reuse of the processes, instructions, models or other artifacts", "modeling language for the EA development" and "select the right tools for EA development"	(Ylimäki, 2008)
Development and maintenance of architecture models	To have effective models, it is important that a documentation plan is created and that these models are communicated, approved and followed by the key stakeholder groups.	(Ylimäki, 2008)
	The models must contain business and architectural requirements that represent a coherent and concise picture of the enterprise.	(Open_Group, 2009; Ylimäki, 2008)
	Business requirements must be traceable within the models and the architectural decisions must be documented.	(Ylimäki, 2008)
	With a transition plan the road to the target architecture can be described, communicated and approved.	(Ylimäki, 2008)
Skills	It is important that the people get the time to learn, get trained and get acquainted with the frameworks and governance model	(Seppanen et al., 2009; Ylimäki, 2008)
	It is also important that teams consist of the right people with the right skills, business and technical, and clearly defined roles and responsibilities.	(Ylimäki, 2008)

7.11 Appendix K Projects and alignment guidelines mapped to EAM topics

	Guidelines	EAM topics
Projects	Stakeholders must understand the project context comprehensively and documentation and information must be provided to all key players during the implementation.	Communication
	Classify projects in order of business importance.	Planning
	Evaluate IT managers based on how well they fulfill objectives of the broader IT strategic plan.	Skills
	Keep part of the IT budget unallocated to any specific project; use it for projects which emerge over the course of the year.	Governance
	Avoid over-formalizing project-portfolio management and prioritization.	Development and maintenance of architecture models
	Articulate business metrics (cycle time reduction, cost savings etc.) and technical metrics (on time, within budget) for project success.	Communication
	Measure and monitor business success criteria, post project-execution.	Planning
	Create multiple approval authorities, depending on project size and budget.	Governance
	Acquire and release temporary resources for projects.	Planning
	Functional project team members should take care of process and workflow requirements, IT members should address development, configuration and customization.	Governance
	Functional project team leads should coordinate user requirements and change requests, technical leads should match these with capabilities of the technology.	Governance
	Appoint functional project sponsors.	Governance
	Institute software-based and governance- based processes for project monitoring.	Governance
Alignment	A set of organization values that govern decisions helps ensure alignment. Strategic decisions remain consistent with these values, while retaining scope for autonomous action as initiatives are deployed.	Governance
	Action planning workshops across all levels helps align the interpretation of the strategy. The action planning process and the dialogue it promotes helps align the everyday decision making in units or departments with the strategic direction.	Planning
	Link project plans to formally documented aims for the initiative (that is, identify how individual projects align with the strategy).	Development and maintenance of architecture models
	Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture. In top-down cultures changing behavior and routines through task alignment is more effective than using logic and persuasion.	Communication
	Linking strategic and operational change is important for developing detailed action plans, key tasks and control processes. It is also important in communicating the initiative in a task-oriented manner throughout the organization.	Development and maintenance of architecture models
	Allocating resources to the new initiative through the budget aligns behaviour with the strategy.	Planning
	Developing a suggestion process can assist alignment, especially for those not in the leading group. An anonymous process for suggestions	Communication

	and feedback is effective.	
	Aligning compensation and recognition systems with the strategy helps ensure that behaviors support the strategic objectives.	Commitment
	Breaking the strategic plan into required activities and defined tasks.	Planning
	Put resources against the activities and tasks.	Planning
	Monitor the performance of the activities and tasks.	Planning

7.12 Appendix L Complete set of guidelines derived from literature

Topic	Guideline
EA governance	The conformance of change projects need to be ensured via formal review and approval processes.
	Formal review and approval processes need a governance structure that is positioned into the broader scope of IT and corporate governance.
	The adoption of the governance structure must be started immediately when an organization decided to initiate the development of EA.
	To set up a governance structure the roles, responsibilities and authorizations must be defined, documented and arranged as well as the processes, activities and tasks.
	Change management practices for architectural and organizational changes and risk management for architectural risks must be defined, documented and arranged.
	Keep part of the IT budget unallocated to any specific project; use it for projects which emerge over the course of the year.(projects)
	Create multiple approval authorities, depending on project size and budget.(projects)
	Functional project team members should take care of process and workflow requirements, IT members should address development, configuration and customization.(projects)
	Functional project team leads should coordinate user requirements and change requests, technical leads should match these with capabilities of the technology.(projects)
	Appoint functional project sponsors.(projects)
	The form of the deployment infrastructure is context specific, so a single change agent or “champion” may be appropriate in some circumstances, and a team approach in others.
	Clearly identify the roles of those involved, for example, the champion, mentor/sponsor, team member.
	Aim for champions at several levels in the organization.
	A consultative approach to deployment often entails setting up project teams or task forces. Teams may be cross-functional or within business units.
	Teams are usually responsible for identifying drivers for the objectives and developing action plans.
	An alternative is the intervention approach, where co-ordination and authority remain with the change agent, but aspects of deployment are delegated. Teams may be set up that have responsibility for partial implementation of solutions. The change sponsor monitors progress and may intervene to ensure changes are implemented.
	A participative approach to deployment (such as project teams) is most appropriate for incremental change in organizations.
	Directive approaches are more common when transformational change is required.
	To allocate the best people with the right skills to the right job.

	Staffing the organization with the needed skills and expertise, consciously building and strengthening strategy-supportive competencies and competitive capabilities, and organizing the work effort.
	A set of organization values that govern decisions helps ensure alignment. Strategic decisions remain consistent with these values, while retaining scope for autonomous action as initiatives are deployed. (aligning implementation)
Communication	Communication must consist of a communication plan and strategy that need to be documented and used.
	Common, well-defined vocabulary of concepts and terms must be defined, documented and used, which need to communicated through various channels at certain moments in time.
	Stakeholders must be informed about all EA- related issues and success.
	Institute formal IT-business communication through regular meetings of steering and project committees, desktop icons on user screens for IT support requests, corporate portals and newsletters, and IT point-person within functions.
	Informal and impromptu walk-arounds by IT managers.
	It is critical to create a culture that appreciates communication.
	Mutual feedback is important to achieve effective communication
	Stakeholders must understand the project context comprehensively and documentation and information must be provided to all key players during the implementation.(projects)
	Articulate business metrics (cycle time reduction, cost savings etc.) and technical metrics (on time, within budget) for project success.(projects)
	Good communication avoids misinformation or lack of information impeding deployment.
	Two-way communication with all employees helps understanding of the initiative.
	Small group briefings facilitate feedback and clarification.
	Document and communicate expectations.
	Ensure good communication of the business drivers.
	Middle managers play a key role in communicating strategies and for ensuring a shared understanding of the strategy.
	Informal communication can be more important than formal communication of strategy.
	Conduct retreats, staff meetings, project meetings, round tables, and post strategic plan documents on company portals.
	Communication channels must be highly visible in the workplace, for example scorecards, dashboard and flowcharts.
	Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture. In top-down cultures changing behavior and routines through task alignment is more effective than using logic and persuasion. (aligning implementation)
	Developing a suggestion process can assist alignment, especially for those not in the leading group. An anonymous process for suggestions and feedback is effective. (aligning implementation)

Planning	Assessment of strategic business and IT options through architects.
	Development of strategic architecture initiatives.
	Update of target architecture.
	Derivation of roadmaps.
	Assessment and prioritization of the project portfolio.
	Business planning must be linked to IT planning in a way that business plans are being supported by strategic IT plans. To enable this, the content of IT and business plans must be aligned and regular meetings and interaction among the CEO, CFO, COO and CIO must occur.
	Classify projects in order of business importance.(projects)
	Measure and monitor business success criteria, post project-execution.(projects)
	Acquire and release temporary resources for projects.(projects)
	Identifying options during deployment is an important element of risk management in strategy implementation.
	A decision process using business models and proven decision tools can be used to evaluate alternative courses of action. Formally considering alternatives minimizes risk. Identified risks should be prioritized, and then plans made to mitigate and manage them.
	A set of organization values acts as a reference point when considering each option, and guides decision making.
	It is during the action planning phase that many options and alternatives will be considered, including choosing the performance measures to be used to track progress.
	In manufacturing firms, identifying options when implementing business strategies (for example, choice of products and prices) is important to gaining a cost advantage.
	If the strategic initiative is to be deployed through a series of projects, then identifying which potential projects will proceed, and the scheduling of a flow of projects to ensure continuity is important.
	Action planning workshops across all levels helps align the interpretation of the strategy. The action planning process and the dialogue it promotes helps align the everyday decision making in units or departments with the strategic direction. (aligning implementation)
	Allocating resources to the new initiative through the budget aligns behaviour with the strategy. (aligning implementation)
	Breaking the strategic plan into required activities and defined tasks. (aligning implementation)
	Put resources against the activities and tasks. (aligning implementation)
	Monitor the performance of the activities and tasks. (aligning implementation)
Commitment	To be able to get commitment for the EA function, architects need to have an extensive network within the company and results of EAM must be communicated with management functions.
	The top management must be involved in the development of EA to get top management commitment.
	A consultative approach through participation increases ownership and commitment.
	Consultation with key stakeholders, including employees, at the planning and implementation phases increases buy-in.

	Cultural and organizational elements underpin success in implementation. An initiative that matches the culture and competencies of an organization can ensure a rapid and successful implementation.
	Senior management demonstrating their commitment to the initiative increases buy-in.
	Using a formal process such as action planning to convert strategic objectives into action plans helps understanding and buy-in.
	Linking strategy to departmental and operational goals helps buy-in and alignment.
	The application of many HR policies, including compensation packages, incentives, employee relations and training, are associated with how employees relate to the strategic direction of an organization, and so can facilitate buy-in.
	Middle managers need to be involved in the formulation of strategic initiatives. Due to the contribution in the strategic efforts they will develop a sense of ownership.
	Creating a company culture that enables successful strategy implementation.
	Aligning compensation and recognition systems with the strategy helps ensure that behaviors support the strategic objectives. (aligning implementation)
Skills	People need to get the time to learn, get trained and get acquainted with the frameworks and governance model.
	Teams must consist of the right people with the right skills, business and technical, and clearly defined roles and responsibilities.
	Skills (relating to technology and culture) required other of IT professionals at the execution level change as the business strategy changes; retool skills and expertise of the IT function and keep them continually current.
	Training/skill development opportunities must be available for IS personnel to become customer-oriented and business knowledgeable.
	Evaluate IT managers based on how well they fulfill objectives of the broader IT strategic plan.(projects)
	A robust system of performance measurement is needed to evaluate the progress of the deployment of a strategic initiative and to identify opportunities for improvement.
	Performance measurements can range from a large number of metrics to a single KPI. There should be regular review of progress by monitoring the appropriate measures.
	The choice of KPIs determines the activities management will focus on during deployment, and therefore the learning that will take place.
	Planned strategy and emergent (unplanned) strategy typically evolve hand-in-hand and interact as strategic initiatives are implemented. This should allow the experience gained during deployment to shape ongoing strategy.
	Strategic initiatives should be continually evaluated and adapted as events unfold during the process of deployment. Be sensitive to external environmental signals, and continuously adapt to changes in the environment.
	There should be regular evaluation of the progress of strategy implementation by the board of directors.
	The board should also ensure that a steady flow of initiatives and projects is established in order to achieve the strategic objectives.

	A continuous improvement philosophy and the core CPE values of organizational and personal learning facilitate learning at all levels.
	Middle management must monitor the performance of individuals and groups who are tasked with strategy implementation.
Development and maintenance of architecture models	To have effective models, it is important that a documentation plan is created and that these models are communicated, approved and followed by the key stakeholder groups.
	The models must contain business and architectural requirements that represent a coherent and concise picture of the enterprise.
	The business requirements must be traceable within the models and the architectural decisions must be documented.
	With a transition plan the road to the target architecture can be described, communicated and approved.
	Avoid over-formalizing project-portfolio management and prioritization.(projects)
	The business drivers are the main business reasons for deploying a strategic initiative.
	A systematic process (research phase) should be used to identify drivers for objectives.
	The business drivers form the basis for developing action plans, and action plans should relate back to the business drivers.
	An understanding of the drivers by implementers (typically middle managers) is important during the deployment phase. Ensuring good communication of the drivers can be achieved by, for example, workshops or by having an expert on the team.
	Involving wider teams in the assessment of achievement against the drivers will facilitate understanding. Examples are KPI monitoring or regular reviews against objectives.
	Most businesses have systems to improve customer and market focus, and are focusing on other drivers, for example, innovation, for future success.
	A redirection of training and support will be required for any new business drivers identified.
	Installing information and operating systems that enable company personnel to better carry out their strategic roles day in and day out.
	Link project plans to formally documented aims for the initiative (that is, identify how individual projects align with the strategy). (aligning implementation)
	Linking strategic and operational change is important for developing detailed action plans, key tasks and control processes. It is also important in communicating the initiative in a task-oriented manner throughout the organization. (aligning implementation
Methodology	The methodology should be based on an existing architectural framework.
	When a methodology is going to be chosen, the following aspects should be considered; “guidance for decision making and documentation”, “support for reuse of the processes, instructions, models or other artifacts”, “modeling language for the EA development” and “select the right tools for EA development”
	Institute software-based and governance- based processes for project monitoring.(projects)

7.13 Appendix M List of questions

Phase 1 single embedded case study

1. Does this guideline apply to Marel in relation to business & IT alignment and strategic & tactical alignment?
2. Why is that?
3. What guidelines can be combined in relation to business & IT alignment and strategic and tactical alignment?
4. Why is that?

Phase 2 single embedded case study

1. Is this a good guideline for Marel?
    a. <If yes> Is this guideline being applied within Marel?
        i. <If yes> Is this guideline being applied good enough?
            1. <If yes> What will be the value of this guideline?
            2. <If no> When you compare the current situation to a future situation with the guideline being used, what will be the added value?
        ii. <If no> When you compare the current situation to a future situation with the guideline being used, what will be the added value?
    b. <If no> Should the guideline be changed to become a good guideline for Marel?
        i. <If yes> What will be the improvement?
        ii. <If yes> Is the improved guideline being applied within Marel?
            1. <If yes> Is this guideline being applied good enough?
                a. <If yes> What will be the value of this guideline?
                b. <If no> When you compare the current situation to a future situation with the guideline being used, what will be the added value?
            2. <If no> When you compare the current situation to a future situation with the guideline being used, what will be the added value?
        iii. <If no>Why isn't this a good guideline for Marel?
2. Does the conceptual EAM guideline framework have added value for Marel?
    a. <If yes> What is the added value
    b. <If no> Why doesn't it provide added value?

Phase 3 single embedded case study

1. Do you agree with the analysis about the guideline?
    a. <If yes> Data ready for analysis.
    b. <If no> Why don't you agree with the analysis?
    c. <If no> Adjust the analysis
2. Do you agree with the analysis about the conceptual EAM guideline framework?
    a. <If yes> Data ready for analysis.
    b. <If no> Why don't you agree with the analysis?
    c. <If no> Adjust the analysis

7.14 Appendix N File type explanation

For phase one and two of the single embedded case study, the retrieved data is stored in two different file types at different locations. One file type contains the contextual data, which is; location, date, time, duration, the setting of the interview, background information of the interviewee (nationality and section) and the impression of the interview. The naming convention of this file type is [fixed text "CON"] [fixed text "DATA"] [Random number between 01 to 13]. For example "CON DATA 01". The second file type contains the results of the interview. The naming convention of this file type is [Interview results] [year/month/day][executive management or middle management] [business or IT]. For example "IVR1 20150915 EXM BUS". These two file types can be linked to another via a "key". This is done for the second phase of the single phase of the single embedded case study. The following figure provides an example of the file types in relation to the key. The key will be stored in a separate file at a separate location. The analyzed data will be stored at a separate location and will use as a naming convention [fixed text ANALYSIS] [Section].

Interview results	Key	Contextual data
•IVR1 20150915 EXM BUS •IVR2 20150916 MID IT	•IVR1 20150915 EXM BUS = CON DATA 08 = REC FILE 13 •IVR2 20150916 MID IT = CON DATA 03 = REC FILE 02	•CON DATA 03 •CON DATA 08

For the third phase of the single embedded case study two different file types were used and stored at different locations. The first file type contains the results of the evaluation of the alternative guidelines. The naming convention of this file type is [fixed text "IV"] [Number of the interview] [fixed text "Alternative guidelines"]. For example "IV1 Alternative guidelines". The second file type contains the validated interview registration. The naming convention of this file type is [fixed text "IV"] [Number of the interview] [fixed text "REG PHASE 2 Confirmation Received"]. For example "IV1 REG PHASE 2 Confirmation Received". The files for the single embedded case study are all Excel files.

The files used contains the results of the analysis are:

- Results alternative guidelines.xlsx
- Results criteria.xlsx
- Results Fleiss kappa.xlsx
- Results percentages.xlsx
- Results Cronbach's alpha.sav
- First set of guidelines.xlsx

The reliability calculation, Cronbach's α will be processed via SPSS. The other results are saved in Excel files.

7.15 Appendix O Invitation email

Subject: Final university thesis at Marel

Dear Mr. xxxxx,

My name is Frans Melssen and I work within the service department of IC poultry as a Service Business Engineer. Currently I am studying Business Process Management & IT at the Open University and I am busy with my final thesis. The goal of my assignment is to:

Develop enterprise architecture management (EAM) guidelines to manage the alignment between business and IT and between strategic and tactical level.

At this moment I finished my literature study which resulted in a conceptual EAM guideline framework with corresponding guidelines. I would like to test this framework and guidelines for applicability within Marel. Via an introduction meeting, a face to face interview and an analysis meeting I would like together with business and IT management at strategic and tactical level come to an answer on the applicability of this framework. During the introduction meeting I would like to explain this research in more detail. The face to face meeting will be necessary to determine the value of the framework and corresponding guidelines for Marel. The first analysis will be presented and is meant to show the results and to verify these with the management.

I've planned to perform the introduction and face to face interview in week 38 and the analysis meeting in week 41. The introduction meeting will take 1 to 1,5 hours. The face to face meeting will take 1 to 2 hours and the analysis meeting will also take 1 to 2 hours.

Via this email I would like to ask you if you can make time available for this research.

Please let me know at your earliest convenience.

In case of any questions, please do not hesitate to contact me.

Kind regards,
Frans Melssen

Tel. +31 xxx xxx xxx
Mob. +31 6 xx xx xx xx

Ps. attached you will find the final assignment description, which provides more details about the problem description, goal, research questions, research design and planning.

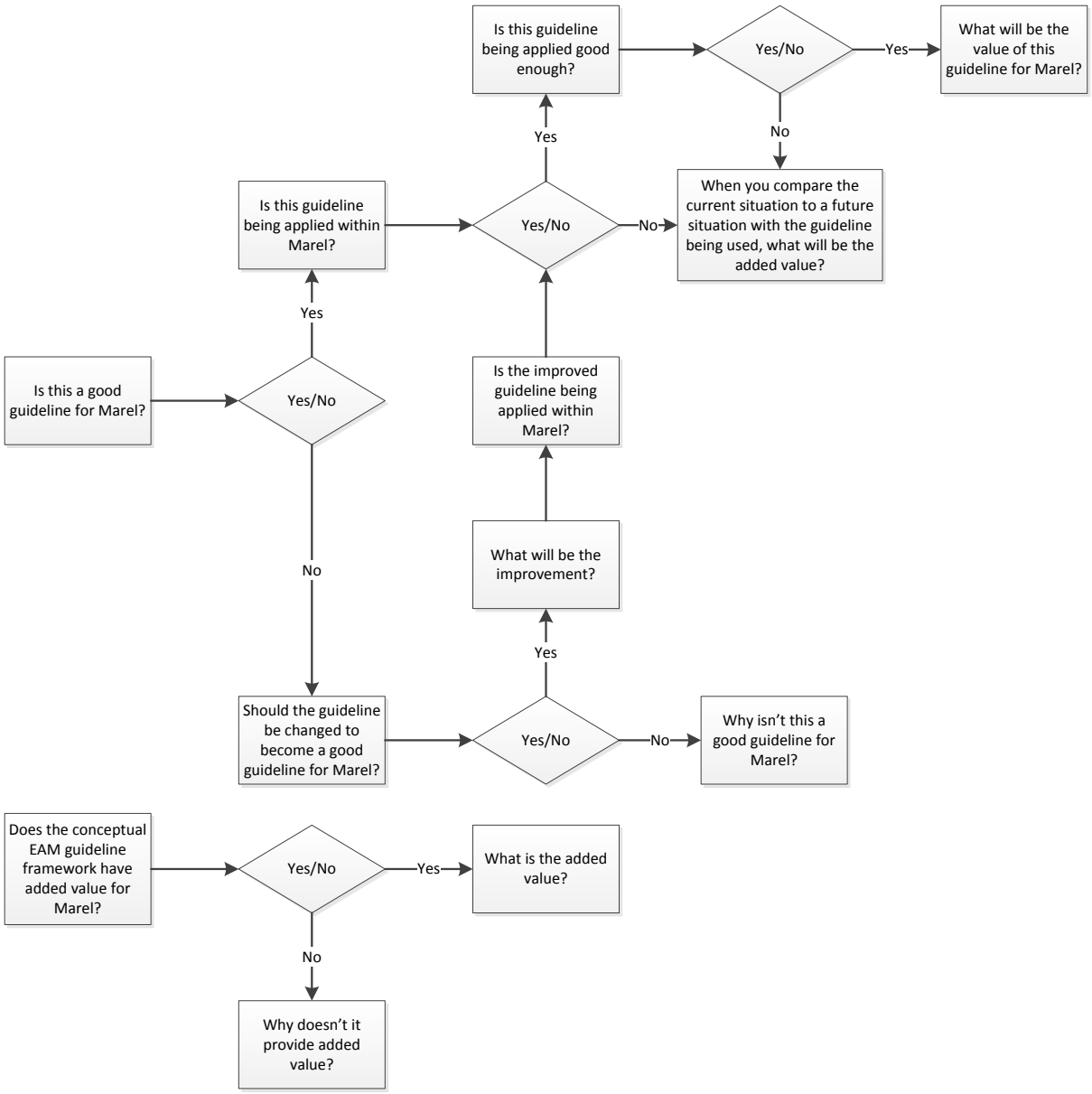
7.16 Appendix P Execution of the single embedded case study

The single embedded case study is divided into three phases.

Phase 1
The first phase focusses on which guidelines were definitely not applicable for Marel or could be combined. The procedure consists of four steps. The first step was to inform the manager about the subject, literature study and the goal of the interview before the interview was conducted. This to ensure that the manager can prepare properly for the interview. The second step was to find book a quiet meeting room that could not be overheard or the managers own office. The third step was to start the interview and ask the manager for his or her cooperation and to point out that the manager always has the right to refuse to answer or to withdraw from the interview. The last step was to ask the manager for permission to record the interview. The result of this phase was a reduced list of guidelines that are applicable for Marel. To be able to achieve this, the following questions were used:

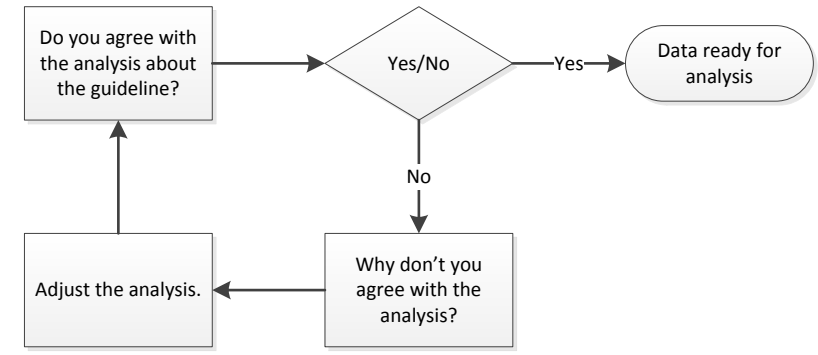
- *Does this guideline apply to Marel in relation to business & IT alignment and strategic & tactical alignment?*
- *Why is that?*
- *What guidelines can be combined in relation to business & IT alignment and strategic and tactical alignment?*
- *Why is that?*

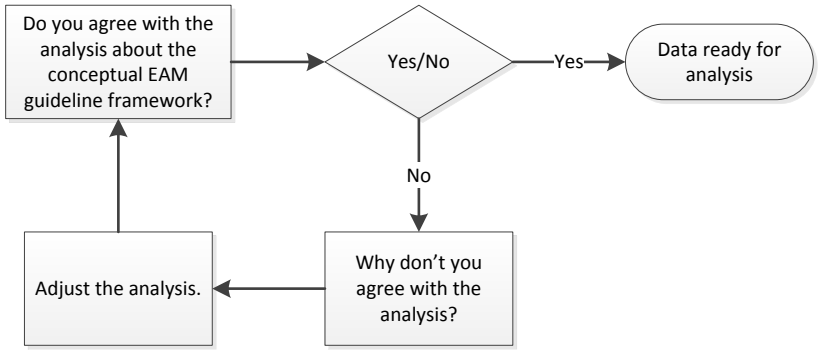
Phase 2
The second phase focused on the value of the theoretical framework and guidelines and how to improve them. This phase uses the same procedure as in the first phase. The questions that will be asked during the interview were divided into two groups. The first group of questions was about the guidelines and the second group of questions was about the theoretical framework. The result of this phase consisted of an overview which contains the guidelines that are valuable for Marel and why they are valuable. It also contains a description of the value of the framework for Marel. The following figure shows the questions that were asked to be able to achieve this result. The reason for asking closed questions is to be able to analyze how much the managers agree with each other. This is done via the Fleiss' Kappa coefficient. The open question "When you compare the current situation to a future situation with the guideline being used, what will be the added value?", is asked to get an answer based on the practical experience of the manager. Managers explained the practical improvements that can be generated when the guideline is being used.



Phase 3

Within the third phase, the information received from the second phase was validated together with the analyzed improvements. The analysis of the improvements resulted in alternative guidelines that the manager had to value. The validation was executed via an email together with two groups of questions. The first group of questions was about the theoretical framework and the guidelines and the second group was about the alternative guidelines and framework. Due to the timeframe of this research the results of the alternative guidelines was not validated once more within this research. The answers to the questions resulted in a manager that agrees with the analysis or an explanation what had to be changed. The questions used are shown in the following figure.


Do you agree with the analysis about the guideline?
Yes/No
Yes
Data ready for analysis
No
Adjust the analysis.
Why don't you agree with the analysis?


Do you agree with the analysis about the conceptual EAM guideline framework?
Yes/No
Yes
Data ready for analysis
No
Adjust the analysis.
Why don't you agree with the analysis?

7.17 Appendix Q Example excel files with the retrieved data

Phase 1 of the single embedded case study

Topic	Guideline nr.	Guideline		Feedback
EA governance	1	The conformance of change projects need to be ensured via formal review and approval processes.		This guideline must be changed a bit and must be combined with guideline 2. The new guideline will be "The EA conformance of projects need to be ensured via formal review and approval processes. These processes need a governance structure that is positioned into the broader scope of IT and corporate governance."
	2	Formal review and approval processes need a governance structure that is positioned into the broader scope of IT and corporate governance.		Combine with guideline 1
	3	The adoption of the governance structure must be started immediately when an organization decided to initiate the development of EA.		Remove
	4	To set up a governance structure the roles, responsibilities and authorizations must be defined, documented and arranged as well as the processes, activities and tasks.		Must be the first guideline for EA governance.

Phase 2 of the single embedded case study

Topic	Guideline no.	Guideline	Valuable	Improvements	General guideline	Results
EA governance	1	To set up a governance structure the roles, responsibilities and authorizations must be defined, documented and arranged as well as the processes, activities and tasks.	yes	no	no	This guideline is provisionally for all other guidelines in this topic.
	2	The EA conformance of projects need to be ensured via formal review and approval processes. These processes need a governance structure that is positioned into the broader scope of IT and corporate governance.	yes	no	no	This guideline will ensure that IT is connected to the organization and that IT will deliver what was promised.
	3	The form of the deployment infrastructure is context specific, so a single change agent or "champion" may be appropriate in some circumstances, and a team approach in others. This also depends on project size and budget and multiple approval authorities may be necessary.	yes	no	no	This guideline mentions the importance of have a structure to improve the communication between business and IT. It will improve the satisfaction of the receiving party.
	4	Clearly identify and appoint the roles of those involved, for example, the champion, mentor/sponsor, team member for strategic IT, projects and landscaping.	no	no	no	Already exists in guideline no 1
	5	Aim for champions at several levels in the organization on business and IT side.	yes	no	no	
	6	A set of organizational values that govern decisions helps ensure alignment. Strategic decisions remain consistent with these values, while retaining scope for autonomous actions as initiatives are deployed.	yes	no	no	This guideline will enlarge the adoption of the plans and designs, when the plans can be related to a set of agreed values.

Phase 3 of the single embedded case study

Alternative guidelines

Guideline no. 20

	Original guideline	Alternative guideline 1	Alternative guideline 2	
	Informal communication can be more important than formal communication of strategy.	Informal communication is as important as formal communication of strategy.	Formal communication can be more important than informal communication of strategy.	
Rating	2	3	1	

Confirmed interview registration

Agree with the results	Yes	(If yes, you don't need to fill in column H. If no, please fill in column H.)
General comments:		This research can be mirrored to the maturity model of DYA, which can be used for future research. What this research misses are guideline for the monitoring of quality assurance of enterprise architecture.
		Many of these guidelines are not specific for EAM, but are important for EAM.

What should be changed?

Guideline and framework remarks:

Topic	Guideline no.	Guideline	Valuable	Improve-ments	General guideline	Results	What should be changed?
EA governance	1	To set up a governance structure the roles, responsibilities and authorizations must be defined, documented and arranged as well as the processes, activities and tasks.	yes	no	no	This guideline is provisionally for all other guidelines in this topic.	

7.18 Appendix R Research ethics explanation

Damage to participants
The results of this research will not have a negative effect on the welfare of any of the managers as this research is not about them as person, but about their knowledge of the company. Damage to participants will also be depending on the quality of the execution of the other research ethic topics.

Pressure on participants
No stimulating conditions have been offered to the managers. All the time that the managers spend is voluntarily. Managers will be informed that they can withdraw at any moment they choose.

Informing of participant and asking for participation
Via an email the managers are informed about the content of the research and what will be expected from them via an email with attached the definite problem description. Within this email the managers are asked to participate in this research. Also an additional email will be send to inform the managers about the conceptual EAM guideline framework and corresponding guidelines together with the questions that will be asked during the interview, to secure that they understand what will be asked from them during the interview.

Data collection
At the beginning of the data collection the managers will be informed that they can withdraw whenever they want and that they have the right to refuse to answer. In case the setup of the research is going to change, the managers will be informed about the change and asked if they still want to cooperate. To guarantee accuracy and completeness the interviews will be recorded. Permission to record the interview will be asked at the beginning of the interview. At the beginning of the interview the manager will be informed how the confidentiality of the data will be maintained when the data is being processed and stored. During the interviewing, no pressure must be executed on the manager to answer each question. A proposed location and time will be sent to the manager, which can be changed by the manager. By default the chosen location was their own office or a meeting room which was quiet to get quality recordings. The default time frame is from 9:00 till 11:00 or from 14:00 to 16:00.

Data processing and storage
No personal data will be stored except for the section and nationality. This should ensure that the manager is not being recognized.

Analysis and reporting
During the analysis and reporting of the data no data will be excluded or presented differently than received from the managers to ensure the integrity of the researcher.

7.19 Appendix S Preconditions to reduce the interviewer bias

1. *Researcher need to know the context within the company. This is achieved as the researcher works for this company.*
2. *Before conducting the interview, information will be provided to the manager. This information consists of the definitions used in the literature study, a description of the conceptual EAM guideline framework topics, an explanation of the conceptual EAM guideline framework, the questions that will be asked and the EAM guidelines.*
3. *The location that will be scheduled will be the managers own office or a quiet meeting room that cannot be overheard.*
4. *The researcher's appearance must match the setting of the interview.*
5. *The interview will start with questions about research ethics, like if the interview can be recorded. These questions will be followed by a short presentation about this research, to make sure that the manager understands what is expected.*
6. *During the questioning no biased questions will be asked and only if something is unclear for the manager it will be explained without adding the researcher's opinion.*
7. *An active interested attitude is required to make the manager feel heard and understood.*
8. *After the meeting the recordings will be stored, the contextual data will be filled out and the interview registrations will be worked out.*
9. *The interview registration will be send back to the manager for verification/ validation.*

7.20 Appendix T Example calculation for the average value per topic in percentages

Each guideline is rated valuable or not valuable by all managers. In case a guideline was valuable the number 1 was added to the cell underneath the manager and behind the guideline (green cell). In case the guideline was not valuable the number 0 was added to the cell underneath the manager and behind the guideline (orange cell). Next the following formula was used to calculate the percentage valuable per guideline:
*(Total amount of valuable ratings of the guideline / amount of ratings of the guideline) * 100*
Example guideline 2: (3/4)*100% = 75%

Then the average per topic was calculated via the following formula:
Sum of all percentages of a topic / the amount of guidelines within that topic
Example topic EA governance: (100% + 75% + 100% + 75% + 100% + 100%)/ 6 = 89%

Topic	**Guideline no.**	**Guideline**	**Valuable IV1**	**Valuable IV5**	**Valuable IV8**	**Valuable IV11**	
			IT MM	IT MM	IT MM	IT MM	
EA governance	1	To set up a governance structure the roles, responsibilities and authorizations must be defined, documented and arranged as well as the processes, activities and tasks.	1	1	1	1	100%
	2	The EA conformance of projects needs to be ensured via formal review and approval processes. These processes need a governance structure that is positioned into the broader scope of IT and corporate governance.	1	1	1	0	75%
	3	The form of the deployment infrastructure is context specific, so a single change agent or “champion” may be appropriate in some circumstances, and a team approach in others. This also depends on project size and budget and multiple approval authorities may be necessary.	1	1	1	1	100%
	4	Clearly identify and appoint the roles of those involved, for example, the champion, mentor/sponsor, team member for strategic IT, projects and landscaping.	0	1	1	1	75%
	5	Aim for champions at several levels in the organization on business and IT side.	1	1	1	1	100%
	6	A set of organizational values that govern decisions helps ensure alignment. Strategic decisions remain consistent with these values, while retaining scope for autonomous actions as initiatives are deployed.	1	1	1	1	100%

7.21 Appendix U Results alternative guidelines

The guidelines in green are the approved guidelines

Guideline no. 9

		Original guideline	**Alternative guideline 1**		
		Relevant stakeholders must be informed about all relevant EA-related issues and success.	Stakeholders must be informed about all EA- related issues and success via business metrics (cycle time reduction, cost savings etc.) and technical metrics (on time, within budget).		
Rating IV1	IT MM	0	0		
Rating IV2	B MM	1	2		
Rating IV4	B MM	1	2		
Rating IV5	IT MM				
Rating IV6	B EM	2	1		
Rating IV7	IT EM				
Rating IV8	IT MM	2	1		
Rating IV9	B MM	1	2		
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	2	1		

Guideline no. 20

		Original guideline	**Alternative guideline 1**	**Alternative guideline 2**	
		Informal communication can be more important than formal communication of strategy.	Informal communication is as important as formal communication of strategy.	Formal communication can be more important than informal communication of strategy.	
Rating IV1	IT MM	2	3	1	
Rating IV2	B MM	2	3	1	
Rating IV4	B MM	2	3	1	
Rating IV5	IT MM				
Rating IV6	B EM	1	2	3	
Rating IV7	IT EM				
Rating IV8	IT MM	2	1	3	
Rating IV9	B MM	2	3	1	
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	2	3	1	

Guideline no. 23

		Original guideline	**Alternative guideline 1**	**Alternative guideline 2**	**Alternative guideline 3**
		Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture. In top-down cultures changing behavior and routines through task alignment is more effective than using logic and persuasion and when the advantages of the change are explained.	Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture.	Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture. In top-down cultures changing behavior and routines should be done by using logic followed by task alignment.	Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture. In top-down cultures changing behavior and routines through task alignment can be used as well as logic, persuasion and when the advantages of the change are explained.
Rating IV1	IT MM	3	2	1	4
Rating IV2	B MM	1	2	4	3
Rating IV4	B MM	2	1	3	4
Rating IV5	IT MM				
Rating IV6	B EM	2	4	3	1
Rating IV7	IT EM				
Rating IV8	IT MM	2	1	3	4
Rating IV9	B MM	1	3	2	4
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	3	2	1	4

Guideline no. 32

		Original guideline	**Alternative guideline 1**		
		A participative approach to deployment (such as project teams) is most appropriate for incremental change in organizations and directive approaches are more appropriate when transformational change is required.	A participative approach to deployment (such as project teams) is most appropriate for incremental change in organizations and for transformational change as well.		
Rating IV1	IT MM	2	1		
Rating IV2	B MM	1	2		
Rating IV4	B MM	2	1		
Rating IV5	IT MM				
Rating IV6	B EM	1	2		
Rating IV7	IT EM				
Rating IV8	IT MM	2	1		
Rating IV9	B MM	1	2		
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	2	1		

Guideline no. 35

		Original guideline	**Alternative guideline 1**	**Alternative guideline 2**	
		Assessment, classification, prioritization of the project portfolio in order of business importance and based on organizational values provides input to decision making.	Assessment, classification, prioritization of the project portfolio in order of business importance (customer centric) and based on organizational values provides input to decision making.	Assessment, classification, prioritization of the project portfolio in order of business importance provides input to decision making.	
Rating IV1	IT MM	2	1	3	
Rating IV2	B MM	1	3	2	
Rating IV4	B MM	1	3	2	
Rating IV5	IT MM				
Rating IV6	B EM	2	1	3	
Rating IV7	IT EM				
Rating IV8	IT MM	3	2	1	
Rating IV9	B MM	1	2	3	
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	2	1	3	

Guideline no. 39

		Original guideline	**Alternative guideline 1**		
		A decision process using business models and proven decision tools can be used to evaluate alternative courses of action. Formally considering alternatives minimizes risk. Identified risks should be prioritized, and then plans made to mitigate and manage them.	Split the original guideline into two new guidelines 1. A decision process using business models and proven decision tools can be used to evaluate alternative courses of action. Formally considering alternatives minimizes risk. 2. Identified risks should be prioritized, and then plans made to mitigate and manage them.		
Rating IV1	IT MM	1	2		
Rating IV2	B MM	1	2		
Rating IV4	B MM	2	1		
Rating IV5	IT MM				
Rating IV6	B EM	1	2		
Rating IV7	IT EM				
Rating IV8	IT MM	2	1		
Rating IV9	B MM	1	2		
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	1	2		

Guideline no. 49

		Original guideline	**Alternative guideline 1**		
		The models must contain business and architectural requirements that represent a coherent and concise picture of the enterprise.	The models must contain business and architectural requirements that represent a coherent and concise picture of the enterprise and should be agile so they can be changed quickly in case the company makes changes.		
Rating IV1	IT MM	2	1		
Rating IV2	B MM	1	2		
Rating IV4	B MM	1	2		
Rating IV5	IT MM				
Rating IV6	B EM	1	2		
Rating IV7	IT EM				
Rating IV8	IT MM	2	1		
Rating IV9	B MM	0	0		
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	1	2		

Guideline no. 70

		Original guideline	**Alternative guideline 1**		
		A continuous improvement philosophy and the core CPE values of organizational and personal learning facilitates learning at all levels.	A continuous improvement philosophy facilitates learning at all levels.		
Rating IV1	IT MM	1	2		
Rating IV2	B MM	1	2		
Rating IV4	B MM	1	2		
Rating IV5	IT MM				
Rating IV6	B EM	1	2		
Rating IV7	IT EM				
Rating IV8	IT MM	2	1		
Rating IV9	B MM	1	2		
Rating IV10	B EM				
Rating IV11	IT MM				
Rating IV12	B EM				
Rating IV14	IT EM	1	2		

7.22 Appendix V Guidelines that need further investigation

Guideline number	Guideline	Criteria business executive management	Criteria business middle management	Criteria IT executive management	Criteria IT middle management	Valuable for Marel
No. 8	Common, well-defined vocabulary of concepts and terms must be defined, documented and used, which need to communicated through various channels at certain moments in time. These channels can be regular meetings of steering and project committees, desktop icons on user screens for IT support requests, corporate portals and newsletters, and IT point-person within functions.	By executing this guideline, understanding will be generated instead of frustration. However this guideline is more valuable for a big organization like Shell.	The result of applying this guideline will be a common language that will enable better communication between business and IT and will improve buy in.	People will better understand IT when this guideline is applied. The communication channels must be selected wisely.	Common understanding of the business language will reduce misunderstanding.	Yes
No. 9	Stakeholders must be informed about all EA- related issues and success.	It is important that the relevant stakeholders are informed.	It will generate a clear overview on things. However not all middle managers see the added value of this guideline.	This guideline is valuable as there is room for improvement when issues are domain board exceeding.	It is important to communicate the relevant information, which is a must within the boundaries of projects.	Yes
No. 10	Informal and impromptu walk-arounds by IT managers.	Communication will be improved by doing this guideline.	This will improve the understanding and commitment.	By doing this people will connect better and a relationship is built. However it is not a crucial guideline.	This guideline will improve the connection between business and IT.	Yes
No. 12	Mutual feedback is important to achieve effective communication. This supported by small group briefings that facilitate feedback and clarification. Also an anonymous process is needed for suggestions and feedback for those not in the leading group.	If we do guideline 11 than we don't need this guideline. However it will improve the	This guideline will improve open communication and generate buy –in	Understanding will be improved and frustration will be reduced.	People will become more open for feedback and we will become better at what we do.	Yes

		quality and shorten the timeframe of projects				
No. 17	Document, communicate and manage the expectations.	This will result in a better execution of the project, better buy-in and will generate transparency and understanding.	This guideline will prevents disappointment and discussion and will improve the mutual expectations.	This is a general guideline.	Disappointments can be prevented and we will have less frustration and rework.	Yes
No. 20	Informal communication can be more important than formal communication of strategy.	Formal communication is more important. With informal communication, you don't know what is true and what not.	This guideline can bring more support and communication will become easier.	Informal communication should not replace formal communication. Therefore this must be in balance.	It will bring more alignment, however informal communication is not more important.	Yes
No. 23	Implementing new strategy requires making changes in taken-for-granted assumptions and routines that are elements of culture. In top-down cultures changing behavior and routines through task alignment is more effective than using logic and persuasion and when the advantages of the change are explained.	By doing this guideline the strategy implementation can be improved.	This can improve the understanding why things are happening and will lead to less disappointment, but we don't have the culture for it.	This guideline is too vague.	This guideline focusses on the long term vision, but is also vague.	No
No. 29	Using a formal process such as action planning to convert strategic objectives into action plans helps understanding and buy-in.	Not sure if it helps in understanding and buy-in. Without buy-in the guideline is better.	This one is too confusing and very big, however will deliver results based on formal actions.	The action plan is vital.	This will improve understanding why we do certain things and that will create buy-in. It will also provide clearness.	Yes
No. 32	A participative approach to deployment (such as project teams) is most appropriate for incremental change in	It should be a combination of	Mixed answers here as well. One	Simple faster smarter program is	Good communication is	Yes

	organizations and directive approaches are more common when transformational change is required.	participative and directive. However very mixed answers here.	mentions that it always need to be a team approach, others mention that is a combination of both.	a good example how we did this guideline.	essential to make this work, but this can generate speed in doing changes.	
No. 33	Middle managers need to be involved in the formulation of strategic initiatives. Due to the contribution in the strategic efforts they will develop a sense of ownership.	It will improve the quality of the strategy, but should not be done in all level of middle management.	This guideline will improve the ownership and will ensure that we are going in the right direction (clearness). But one manager mentioned that middle managers should focus on tactical level.	It is important the strategic plan is clear for middle management.	Understanding will be increased between executive and middle management. However one manager mentioned that middle management only need to understand the strategy.	Yes
No. 38	Acquire and allocate resources to the new initiative through the budget, aligns behavior with the strategy.	Important guideline	Less discussion around availability and capacity will be the result of this guideline.	Too vague.	Second part of the sentence too vague, but we should be able to execute the initiative.	Yes
No. 40	It is during the action planning phase that many options and alternatives will be considered, including choosing the performance measures to be used to track progress.	By doing this well we will not get surprises at the end of a project.	The guideline can lead to better choices in choosing the right option/alternative and there will be better focus on progress and achievements.	This is a good guideline.	This guideline is already mentioned in other guidelines and you are not planning options, but tasks, but it is important to describe alternatives.	Yes
No. 42	Keep part of the IT budget unallocated to any specific	If we do the	By doing this	It will generate	It will provide	Yes

	project; use it for projects which emerge over the course of the year.	budgeting good, we don't need to keep part of the budget unallocated, however we aren't doing this good enough so most managers believe this is a good guideline.	guideline the agility of IT will increase and provide continuous improvement and flexibility.	more flexibility and then IT can better serve the business.	more flexibility when IT needs to change together with the changing business strategy. However some managers believe we are already doing this, so it is not needed.	
No. 45	Avoid over-formalizing project-portfolio management and prioritization.	Efficiency can be increased with this guideline. But some believe we are doing this already and therefore the guideline is unnecessary.	It improves the quality and saves time.	Good guideline, we are doing this.	Good guideline, we are doing this.	Yes
No. 48	Institute software-based and governance- based processes for Enterprise Architecture, with a strong connection to other parts of the organization like; portfolio management and application landscape.	Most approve that this is a good guideline however one mentions that it is too vague.	This is important and need to be more formal.	We are improving here, but we are not there yet. This is a good guideline.	This guideline will improve the communication, quality and will provide an overview that can be monitored. Also the follow up will be clear.	Yes
No. 51	A systematic process (research phase) should be used to identify drivers for objectives.	Goals will be reached easier, however this is not always needed.	It will improve the understanding of the drivers. This will result in better common understanding and will enable Marel	This is a valuable guideline.	By doing this guideline we will be able to do the right projects. It is key to understand the real problems we want to solve.	Yes

			to identify projects quicker.			
No. 54	Involving wider teams in the assessment of achievement against the drivers will facilitate understanding. Examples are KPI monitoring or regular reviews against objectives.	By doing this guideline we will be able to create a better outcome on all levels and people will be more committed and the project will speed up.	This guideline will improve the self-learning and understanding.	By doing this better, we will get more consistent solutions for the complete company.	Bigger teams will not add value and this guideline is already covered by other guidelines, however it will improve that we are heading into the same direction.	Yes
No. 55	A redirection of training and support will be required for any new business drivers identified.	When strategic goals are changing then the people need to change with them and training is necessary. This will improve understanding and alignment.	This will improve the processes and systems. One manager didn't understand this guideline.	By doing this better we will get quicker the right targets.	This will result in tools that are better used and that some projects aren't even necessary.	Yes
No. 59	Linking strategic and operational change is important for developing detailed action plans, key tasks and control processes. It is also important in communicating the initiative in a task-oriented manner throughout the organization.	It will bring us a better alignment of where we are going to.	This guideline can create more efficiency and effectiveness, but it is a difficult one to understand.	This is important to be able to implement the strategy.	This can generate buy-in and ensures that everybody knows what to do to get a successful strategy, however some managers think this guideline isn't clear enough.	Yes
No. 60	People need to get the time to learn, get trained and get acquainted with the frameworks and governance model.	This will generate commitment and a faster result and that the roles and responsibilities are	This can improve clearness and common understanding, however one	It is an important guideline.	It will create alignment and provides a better understanding of how the landscape	Yes

		clear.	manager thinks this is not a valuable guideline.		must be developed and what process is needed.	
No. 62	Skills (relating to technology and culture) required other of IT professionals at the execution level change as the business strategy changes; retool skills and expertise of the IT function and keep them continually current.	We would have more people with the right skills and we would have a better IT organization.	Situation can be improved, but the guideline doesn't contribute that much.	We need to do this guideline more proactively. It is a valuable guideline.	This guideline ensures a better connection between business and IT.	Yes
No. 64	Evaluate IT and business managers based on how well they fulfill objectives of the broader IT strategic plan.	This is a valuable guideline.	Two out of the three managers believe this is a valuable guideline.	This is the only way to get things done, by setting these kind of things as their targets. Without business sponsorship, IT won't do anything at the moment.	By doing this guideline, buy-in and pressure from the business will be achieved.	Yes
No. 65	The choice of KPIs determines the activities management will focus on during deployment, and therefore the learning that will take place.	This can help in case we become more KPI focused, but at this moment this is not a valuable guideline for Marel.	We need to be better in choosing the KPI's. This can increase the commitment and improve the learning as well.	One manager supports this guideline, the other not.	KPI is not a target on its own, however when we would have the right KPI's we will be better to focus, to learn for the future and to steer.	No
No. 66	Planned strategy and emergent (unplanned) strategy typically evolve hand-in-hand and interact as strategic initiatives are implemented. This should allow the experience gained during deployment to shape ongoing strategy.	By doing this guideline we can initiate the right changes more effectively.	Not an important guideline as this is only applicable for a very mature company.	Strategy should be reviewed more often. Then the strategy will be sharper and we can make better decisions.	We need to stay agile, but strategy should also focus on a longer period.	Yes

No. 72	Staffing the organization with the needed skills and expertise, consciously building and strengthening strategy-supportive competencies and competitive capabilities, and organizing the work effort.	If this guideline works, than the rest of the company will also work.	It will generate a better integral look to how we can improve our processes and that will improve the results. Also the gap between business and IT will become less big, but maybe this guideline is too general.	We are not pro-active enough in hiring skilled people. By making sure that we are getting the right people we need to be more attractive enough to work for.	This results in better anticipation so that there is a better understanding between business and IT and between strategic and tactical level.	Yes
No. 73	Middle management must monitor the performance of individuals and groups who are tasked with strategy implementation.	Yes, this is an important guideline.	By executing this guideline we will be better and faster in achieving the goals and will create awareness, however one manager thinks this guideline is too vague.	We have been doing this in silos, but this should be done from one vision and should be top-down.	Logical next step after guideline 64 and was also mentioned in topic commitment, however maybe this guideline is too vague and should middle managers focus on tactical implementation.	Yes

7.23 Appendix X General comments and general guidelines

General comments made by the managers.

Comment	**Amount of managers that mentioned the general comment**
This research can be mirrored to the maturity model of DYA, which can be used for future research. What this research misses are guidelines for the monitoring of quality assurance of enterprise architecture.	1
Many of these guidelines are not specific for EAM, but are important for EAM.	1
There are too many guidelines	6
Some guidelines can be combined	2
Some guidelines look more like a statement and maybe should be adjusted so it is more like a guideline.	1
These guidelines don't have much added value. Many of these are general management guidelines and are not to be used within Marel. We are doing well the way we do it now. When there are too many guidelines, then there is no room for own initiative anymore.	1

General guidelines

General guidelines	**Amount of managers**
A set of organizational values that govern decisions helps ensure alignment. Strategic decisions remain consistent with these values, while retaining scope for autonomous actions as initiatives are deployed.	1
Informal and impromptu walk-arounds by IT managers.	1
It is critical to create a culture that appreciates communication.	2
Good communication avoids misinformation or lack of information impeding deployment.	1
Document, communicate and manage the expectations.	2
Ensure good communication of the business drivers.	1
Informal communication can be more important than formal communication of strategy.	1
Consultation with key stakeholders, including employees, at the planning and implementation phases increases buy-in.	1
Using a formal process such as action planning to convert strategic objectives into action plans helps understanding and buy-in.	1
People need to get the time to learn, get trained and get acquainted with the frameworks and governance model.	1
Teams must consist of the right people with the right skills, business and technical, and clearly defined roles and responsibilities.	2
To allocate the best people with the right skills to the right job.	1

7.24 Appendix Y First set of EAM guidelines

Topic	Guideline no.	Guideline
EA governance	1	To set up a governance structure the roles, responsibilities and authorizations must be defined, documented and arranged as well as the processes, activities and tasks.
	2	The EA conformance of projects needs to be ensured via formal review and approval processes. These processes need a governance structure that is positioned into the broader scope of IT and corporate governance.
	3	The form of the deployment infrastructure is context specific, so a single change agent or "champion" may be appropriate in some circumstances, and a team approach in others. This also depends on project size and budget and multiple approval authorities may be necessary.
	4	Clearly identify and appoint the roles of those involved, for example, the champion, mentor/sponsor, team member for strategic IT, projects and landscaping.
	5	Aim for champions at several levels in the organization on business and IT side.
	6	A set of organizational values that govern decisions helps ensure alignment. Strategic decisions remain consistent with these values, while retaining scope for autonomous actions as initiatives are deployed.
Communication	7	Communication must consist of a communication plan and strategy that need to be documented and used.
	8	Common, well-defined vocabulary of concepts and terms must be defined, documented and used, which need to communicated through various channels at certain moments in time. These channels can be regular meetings of steering and project committees, desktop icons on user screens for IT support requests, corporate portals and newsletters, and IT point-person within functions.
	9	Relevant stakeholders must be informed about all relevant EA- related issues and success.
	10	Informal and impromptu walk-arounds or catch up meetings by IT managers and IT employees.
	11	It is critical to create and maintain a culture that appreciates communication.
	12	Mutual feedback is important to achieve effective communication. This supported by small group briefings that facilitate feedback and clarification. Also a process is needed for suggestions and feedback for those not in the leading group.
	13	All relevant stakeholders must understand the project context comprehensively and documentation and information must be provided to all key players during the implementation and accessible for all stakeholders.

	14	Articulate business metrics (cycle time reduction, cost savings etc.) and technical metrics (on time, within budget) for project success.
	15	Good communication avoids misinformation or lack of information impeding deployment.
	16	Two-way communication with key stakeholders helps understanding of the initiative.
	17	Document, communicate and manage the expectations.
	18	Ensure good communication of the business drivers.
	19	Managers play a key role in communicating strategies and for ensuring a shared understanding of the strategy.
	20	Informal communication is as important as formal communication of strategy.
	21	Conduct retreats, staff meetings, project meetings, round tables, and post strategic plan documents on company portals.
	22	Communication channels must be highly visible in the workplace, for example scorecards, dashboard and flowcharts.
Commitment	23	To be able to get commitment for the EA function, architects need to have an extensive network within the company and results of EAM must be communicated with management functions.
	24	The top management must be involved in the development of EA to get top management commitment and buy-in is increased when top management demonstrates their commitment.
	25	A consultative approach through participation increases ownership and commitment.
	26	Consultation with key stakeholders, including employees, at the planning and implementation phases increases buy-in.
	27	Cultural and organizational elements underpin success in implementation. An initiative that matches the culture and competencies of an organization can ensure a rapid and successful implementation.
	28	Using a formal process such as action planning to convert strategic objectives into action plans helps understanding.
	29	Linking strategy to departmental and operational goals helps buy-in and alignment.
	30	The application of many HR policies, including compensation packages, incentives, employee relations and training, are associated with how employees relate to the strategic direction of an organization. Therefore the compensation and recognition systems must be in line with the strategy.
	31	A participative approach to deployment (such as project teams) is most appropriate for incremental change in organizations and directive approaches are more appropriate when transformational change is required.
	32	Middle managers need to be involved in the formulation of strategic initiatives. Due to the contribution in the strategic efforts they will develop a sense of ownership.

Planning	33	Assessment of strategic business and IT options through architects should result in the development of strategic architecture initiatives.
	34	Assessment, classification, prioritization of the project portfolio in order of business importance provides input to decision making.
	35	IT planning must be linked to the business planning in a way that business plans are being supported by strategic IT plans. The content of IT and business plans must be aligned, with executive management.
	36	Measure and monitor business success criteria, post project-execution and the performance of activities and tasks.
	37	With a new initiative, the budget needs to be allocated. Then the resources must be acquired and allocated.
	38	A decision process using business models and proven decision tools can be used to evaluate alternative courses of action. Formally considering alternatives minimizes risk.
	39	Identified risks should be prioritized, and then plans made to mitigate and manage them.
	40	It is during the action planning phase that many options and alternatives will be considered, including choosing the performance measures to be used to track progress.
	41	If the strategic initiative is to be deployed through a series of projects, then identifying which potential projects will proceed, and the scheduling of a flow of projects to ensure continuity is important.
	42	Keep part of the IT budget unallocated to any specific project; use it for projects which emerge over the course of the year.
	43	Performance measurements can range from a large number of metrics to a single KPI. There should be regular review of progress by monitoring the appropriate measures.
	44	With a transition plan the road to the target architecture can be described, communicated and approved.
	45	Avoid over-formalizing project-portfolio management and prioritization.
	46	Action planning workshops across all levels helps align the interpretation of the strategy. The action planning process and the dialogue it promotes helps align the everyday decision making in units or departments with the strategic direction.
Methodology	47	The methodology should be based on an existing architectural framework based on a consideration of the following aspects; “guidance for decision making and documentation”, “support for reuse of the processes, instructions, models or other artifacts”, “modeling language for the EA development” and “select the right tools for EA development”.
	48	Institute software-based and governance- based processes for Enterprise Architecture, with a strong connection to other parts of the organization like; portfolio management and application landscape.

Development and maintenance of architecture models	49	The models must contain business and architectural requirements that represent a coherent and concise picture of the enterprise and should be agile so they can be changed quickly in case the company makes changes.
	50	The business requirements must be traceable within the models and the architectural decisions must be documented.
	51	A systematic process (research phase) should be used to identify drivers for objectives.
	52	The business drivers are needed for developing action plans, and action plans should relate back to the business drivers.
	53	An understanding of the drivers by implementers (typically middle managers) is important during the deployment phase. Ensuring good communication of the drivers can be achieved by, for example, workshops or by having an expert on the team.
	54	Involving wider teams in the assessment of achievement against the drivers will facilitate understanding. Examples are KPI monitoring or regular reviews against objectives.
	55	Training and support can be required for any new business drivers identified.
	56	Link project plans to formally documented aims for the initiative (that is, identify how individual projects align with the strategy).
	57	The current and target architecture need to be updated regularly.
	58	The roadmaps need to be derived from the target architecture.
	59	Linking strategic and operational change is important for developing detailed action plans, key tasks and control processes. It is also important in communicating the initiative in a task-oriented manner throughout the organization.
Skills	60	People need to get the time to learn, get trained and get acquainted with the frameworks and governance model.
	61	Teams must consist of the right people with the right skills, business, technical and personal, and clearly defined roles and responsibilities.
	62	Skills (relating to technology and culture) required other of IT professionals at the execution level change as the business strategy changes; retool skills and expertise of the IT function and keep them continually current.
	63	Training/skill development opportunities must be available for IT personnel to become customer-oriented and business knowledgeable.
	64	Evaluate IT and business managers based on how well they fulfill objectives of the broader IT strategic plan.
	65	Planned strategy and emergent (unplanned) strategy typically evolve hand-in-hand and interact as strategic initiatives are implemented. This should allow the experience gained during deployment to shape ongoing strategy.

	66	Strategic initiatives should be continually evaluated and adapted as events unfold during the process of deployment. Be sensitive to external environmental signals, and continuously adapt to changes in the environment.
	67	There should be regular evaluation of the progress of strategy implementation by the board of directors.
	68	The executive team should also ensure that a steady flow of initiatives and projects is established in order to achieve the strategic objectives.
	69	A continuous improvement philosophy facilitates learning at all levels.
	70	To allocate the best people with the right skills to the right job.
	71	Staffing the organization with the needed skills and expertise, consciously building and strengthening strategy-supportive competencies and competitive capabilities, and organizing the work effort.
	72	Management must monitor the performance of individuals and groups who are tasked with strategy implementation.